



# Stormwater Management Report

April 28, 2023

Proposed Prestige Commerce Center

Block 4.46, Lots 1.04 & 1.07

Block 4.461, Lots 1.07

Township of North Brunswick, Middlesex County, New Jersey

Prepared for:

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Project No. 22001068A

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## Introduction

This stormwater management statement is being submitted as part of the development application known as Preliminary & Final Minor Site Plans for Prestige located on Lot 1.07, Block 4.46, as shown on Sheet 19 of the Official Tax Map of North Brunswick Township, Middlesex County, New Jersey. This statement was prepared in accordance with the New Jersey Department of Environmental Protection (NJDEP), Township of North Brunswick, Freehold Soil Conservation District (FSCD) and current industry standards and practices for stormwater management. Improvements will also take place on Lot 1.04, Block 4.46 and Lot 1.07, Block 4.461. The project will disturb approximately 0.98 acres (46,625 SF) and will decrease both overall impervious surfaces by approximately 0.032 acres (1,401 SF) and vehicle surface area by 0.33 acres (14,563 SF). The purpose of this report is to summarize the stormwater management requirements and how the proposed development complies.

Lot 1.07 is currently developed as an overflow parking lot associated with the Regal Cinema. The proposed development proposes to modify existing site conditions to remove ninety-five (95) parking spaces to construct two (2) pad sites, including Freddy's quick service restaurant, a retail/office/restaurant, as well as associated parking. Additional site improvements include, but are not limited to, pavement, curb, sidewalk, utility relocation, landscaping, and lighting.

## Soil Characteristics

The existing soil classifications for the site are based on the USDA NRCS Web Soil Survey prepared by United States Department of Agriculture, Natural Resources Conservation Service. The survey is useful at the planning level to draw general conclusions about the suitability of a site for certain land uses. Based on the Web Soil Survey, the site and its surrounding area consist of the following soil type:

Soil Name	Hydrologic Group
EkaAr - Elkton Loam, rarely flooded, 0-2% slopes	C/D
NkrA - Nixon moderately well drained variant loam, 0-2% slopes	C
RepwA - Reaville poorly drained variant silt loam, 0-2% slopes	D

## Flood Plains

Based on the Flood Insurance Rate Map (FIRM) prepared by the Federal Emergency Management Agency for the Middlesex County, New Jersey, Map No. 34023C0109F effective date July 6, 2010, the entire lease area is located outside of the 100-year flood plain.

## Riparian Zones

The project site is located more than 300 feet from a water body. Therefore, there are no riparian zones associated with the development.

## Wetland Areas

In accordance with NJ-GeoWeb, no freshwater wetlands are known to exist on-site.

## Compliance Statement

In accordance with N.J.A.C. 7:8-1.2, a major development is considered an individual development or multiple developments that individually or collectively result in the disturbance of one (1) or more acres of land since February 2, 2004, the creation of one-quarter acre or more of "regulated impervious surface" since February 2, 2004, the creation of one-quarter acre or more of "regulated motor vehicle surface" since March 2, 2021, or the combined creation of one-quarter acre or more of "regulated impervious surface" and "regulated motor vehicle surface". Although the proposed development will result in a reduction of both "regulated impervious surface" and "regulated motor vehicle surface", it will disturb more than one (1) acre of land. As such, the proposed development is considered a major development.

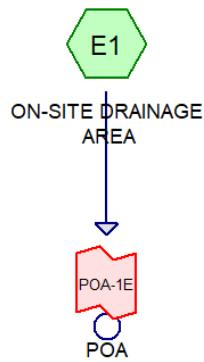
The proposed development will comply with the requirements of N.J.A.C. 7:8 by demonstrating that, at each point of analysis, the post-construction runoff hydrographs for the 2-, 10-, and 100-year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events. This is achieved by decreasing the number of impervious surfaces (including motor vehicle surfaces) from existing to proposed conditions.

## Study Areas

The drainage areas utilized to analyze and calculate the stormwater attenuation requirements for this development were established based on the proposed hydrologic limits of disturbance and the existing and proposed topography. The areas were delineated based upon the direction of runoff, and the overall design was calculated using one drainage analysis point. The point of analysis is the existing stormwater conveyance system that leads to above ground basins off-site, which is currently maintained by the owner. Under the existing conditions, E-1, stormwater drains to the middle of the site to two (2) E-inlets then flows in a north-easterly direction connecting to the point of analysis. The proposed conditions, P-1, similarly, flows to relocated inlets which tie into the exiting stormwater conveyance system and basins.

## Existing Conditions

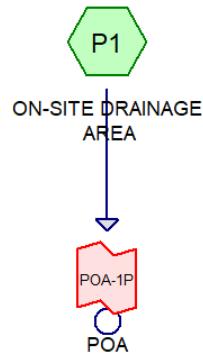
### EXISTING CONDITIONS



**Existing Drainage Area E-1.** Existing Drainage Area E-1 represents the disturbance area of the proposed project. The area is presently developed as an overflow parking lot associated with the existing cinema. The drainage area is over 96% impervious parking area. Runoff from the area is conveyed via overland flow towards an existing storm water conveyance system. Any drain via overland flow will end up in the existing basin off-site.

## Proposed Conditions

### PROPOSED CONDITIONS



**Proposed Drainage Area P-1.** Proposed Drainage Area P-1 represents the disturbance area of the proposed project. This consists of two (2) pad sites, including a Freddy's quick service restaurant, and a retail/office/restaurant. The remaining site area consisting of driveways, parking, and landscaped islands and buffers which will be conveyed via overland flow before being collected

by inlets throughout the site which tie into the existing storm sewer system. The existing storm sewer system connects to the existing basin off-site.

## Stormwater Management Methodology

The proposed development is designed to mimic the existing drainage patterns onsite, while providing additional stormwater management benefits. The proposed development results in a reduction in overall impervious surfaces (including motor vehicle surfaces) onsite. Therefore, there will be a reduction in the peak runoff rates at both analysis points. Below is a table with pre- and post-development peak runoff rates for the 2-year, 10-year, and 100-year storm events.

To evaluate the proposed site for compliance with the above standards, the Soil Conservation Service's Unit Hydrograph method and the HydroCAD v10.10-3a hydrologic/hydraulic model were utilized. The Standard Unit Hydrograph was utilized for modeling both the existing and proposed conditions. A summary of the results is presented in the following tables:

**Table 1: POA Peak Runoff Analysis Results**

Storm (Year)	Existing (POA-1E) (cfs)	Proposed (POA-1P) (cfs)
2	4.375	4.324
10	6.759	6.704
100	11.475	11.419

Comparison hydrographs are provided in the Appendix, indicating the post-construction hydrographs are at or under the pre-construction hydrographs at all points for all drainage areas, to demonstrate compliance with the Stormwater Management Rules at N.J.A.C. 7:8.

## Water Quality N.J.A.C. 7:8-5.5

The proposed overall development is exempt from the Water Quality requirements as it will not increase impervious surfaces by more than 0.25 acres.

## Storm Sewer Design

Under existing conditions, there is a 15" RCP storm sewer pipe running through the site that is to be relocated in the proposed design. The proposed stormwater structures and pipes will connect to this existing stormwater conveyance system and the drainage patterns will generally stay the same. The storm sewer has been designed in accordance with the Township and NJDEP requirements. The proposed storm sewer was designed to pass the 25-year storm. Using the SCS Method with a minimum time of concentration of 6 minutes and the Trenton Intensity-Duration-Frequency Table, the proposed conveyance pipes were analyzed. Manning's formula, with a coefficient of 0.013 for RCP pipe and 0.012 for HDPE pipe was utilized for sizing stormwater pipes. When modeling the storm sewers, a conservative "C" coefficient of 0.99 was assumed for all surfaces contributing runoff

to the stormwater conveyance system. The "C" value is conservative because it generates a greater volume of runoff than actual conditions by assuming it is all impervious surfaces. The proposed redevelopment will decrease impervious coverage (0.032 acres), so there should be minimal effect on the relocated conveyance system even though there is a slight decrease in slope.

## Groundwater Recharge N.J.A.C. 7:8-5.4(A)2

The subject site is located in the Metropolitan Planning Area, which is classified as Urban Redevelopment Area. Per N.J.A.C. 7:8-5.4 Urban Redevelopment Area are exempt from groundwater recharge requirement.

## Soil Erosion and Sediment Control

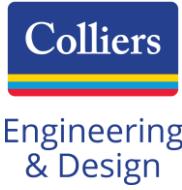
In accordance with the Soil Erosion and Sediment Control Act, soil erosion measures will be incorporated into the design and graphically depicted on the Soil Erosion and Sediment Control Plans. These measures consist of, but are not limited to:

- Silt Fences
- Stabilized Construction Access
- Topsoil Stockpiles
- Storm Sewer Inlet Protection
- Temporary and Permanent Stabilization

Per the Standards for Soil Erosion and Sediment Control in New Jersey, off-site stability must be met both at the point of discharge and downstream of the point of discharge. Point discharge is met by connecting the outfall from the proposed stormwater conveyance system to an existing conveyance system, which is considered a stable discharge point. The increase in impervious coverage is considered a *de-minimus* amount and should not have a negative impact downstream of the discharge point as the conveyance system eventually discharges into the overall shopping centers existing stormwater management system.

## Conclusion

The proposed development will lead to a decrease in impervious surfaces (including motor vehicle surface), which will decrease the runoff rates for the site. The stormwater design is in compliance with the Town, County, SCD and NJDEP regulations and will result in a reduction in peak discharge to the analysis point and complies with water quality and groundwater discharge.



## Appendix A

[Tax Map](#)

[Aerial Map](#)

[Soils Map](#)

[FEMA map](#)

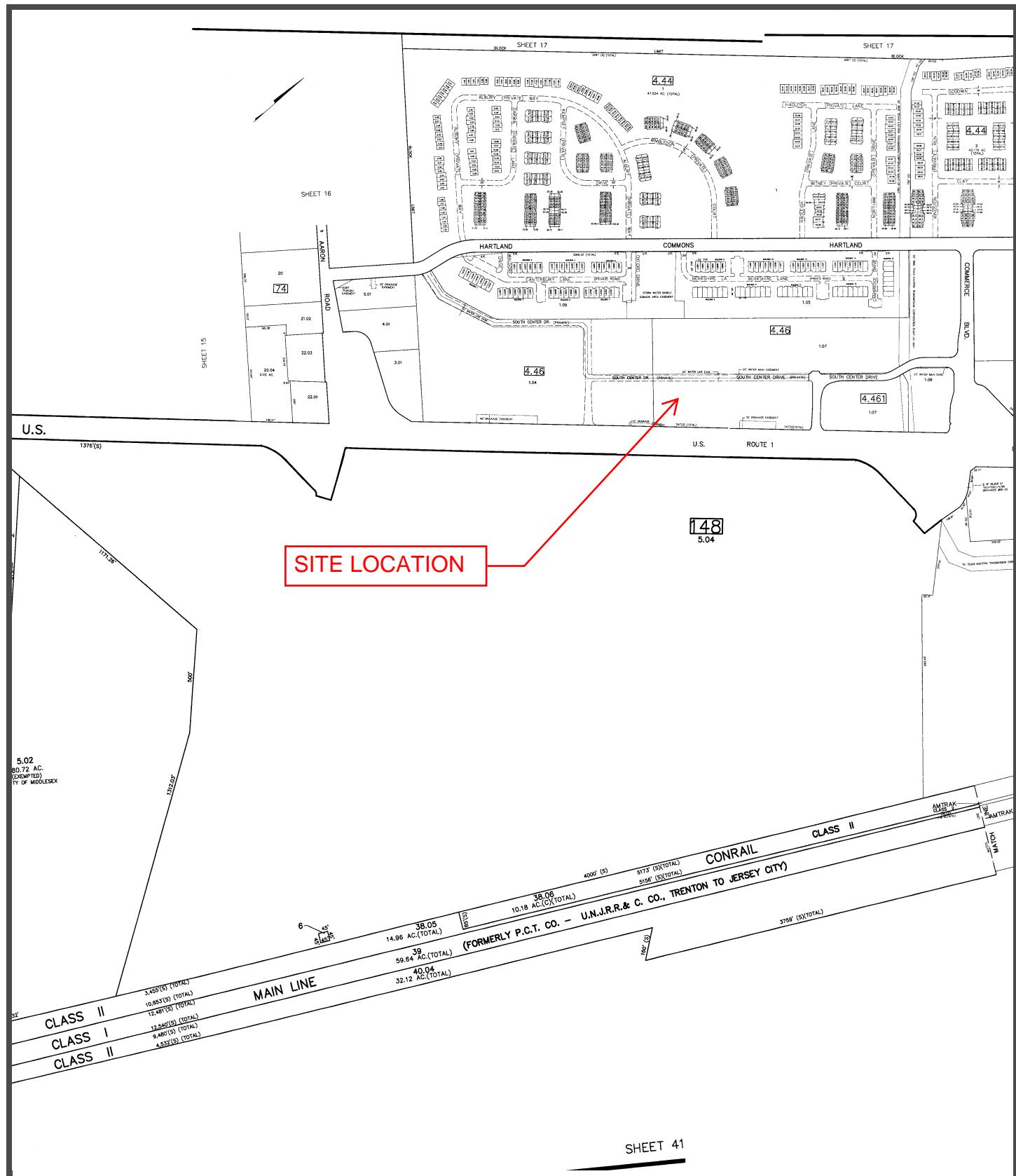
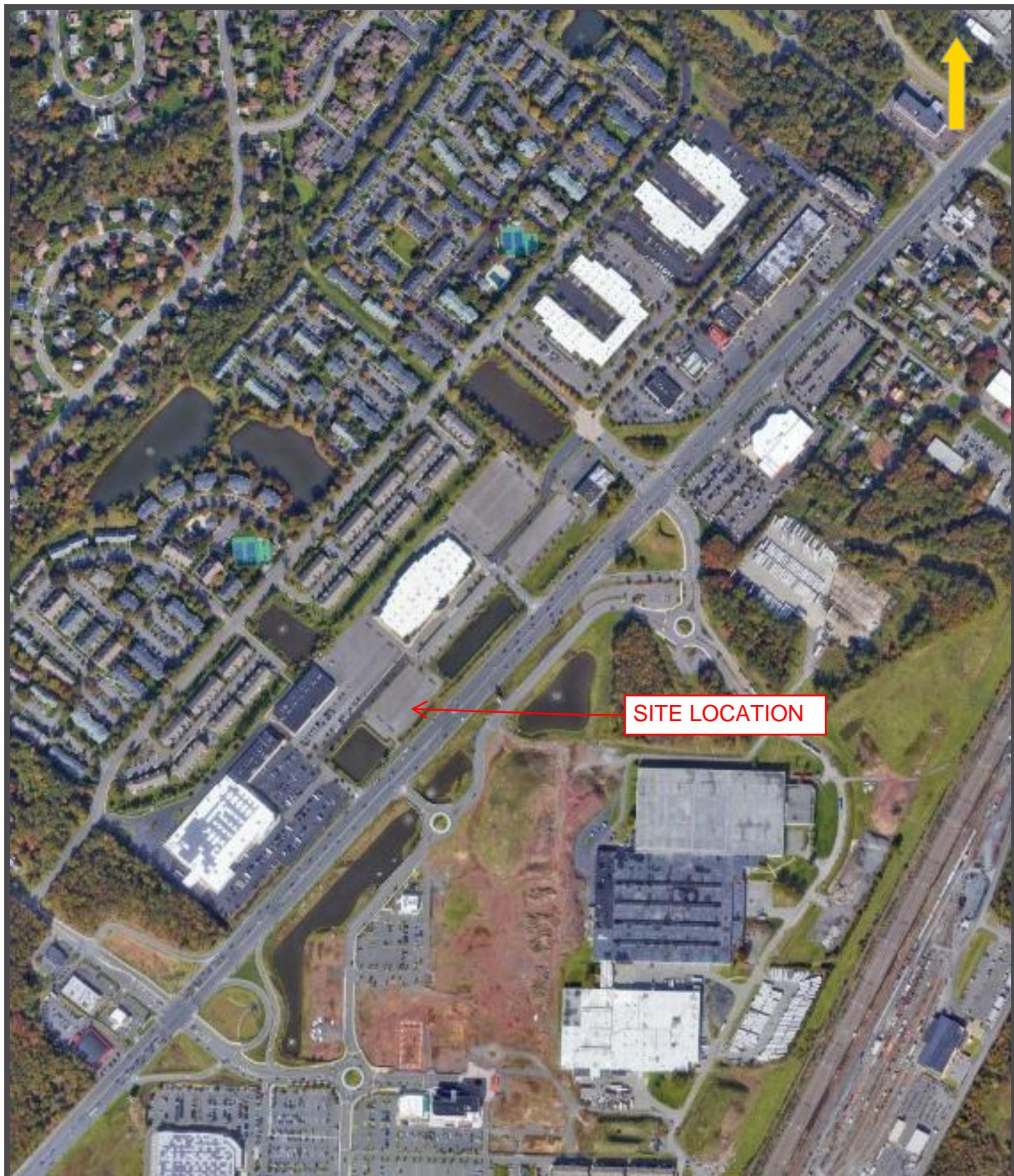


Figure 1: Tax Map  
Township of North Brunswick – Freddy's

Scale: NTS

Date: April 28, 2023

Project No. 21000124A



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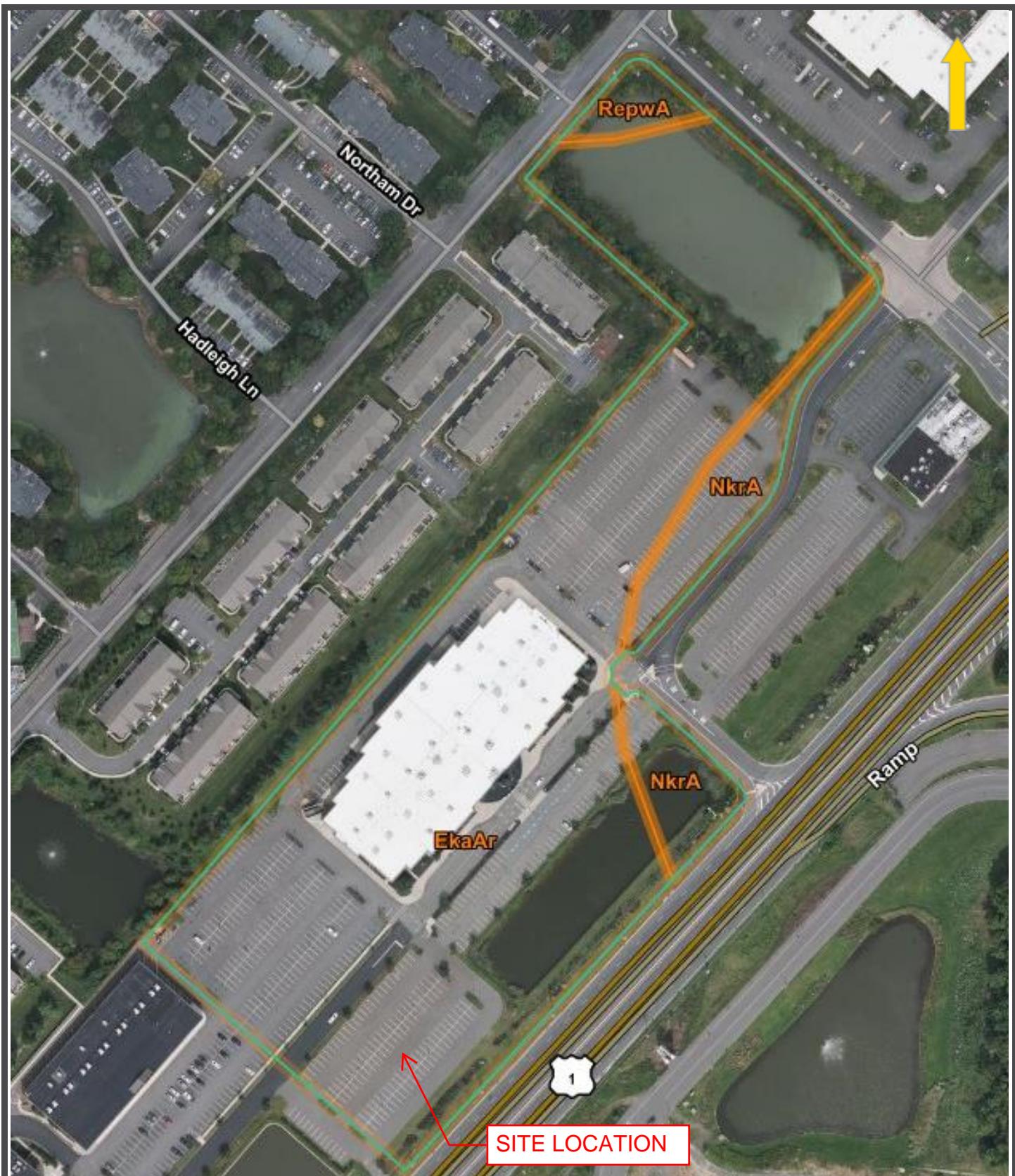
Figure 2: Aerial Map  
Township of North Brunswick – Freddy's

Source: Google Earth

Scale: NTS

Date: April 28, 2023

Project No. 21000124A



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Figure 3: Soils Map  
Township of North Brunswick – Freddy's

Source: Web Soil Survey

Scale: NTS

Date: April 28, 2023

Project No. 21000124A

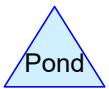
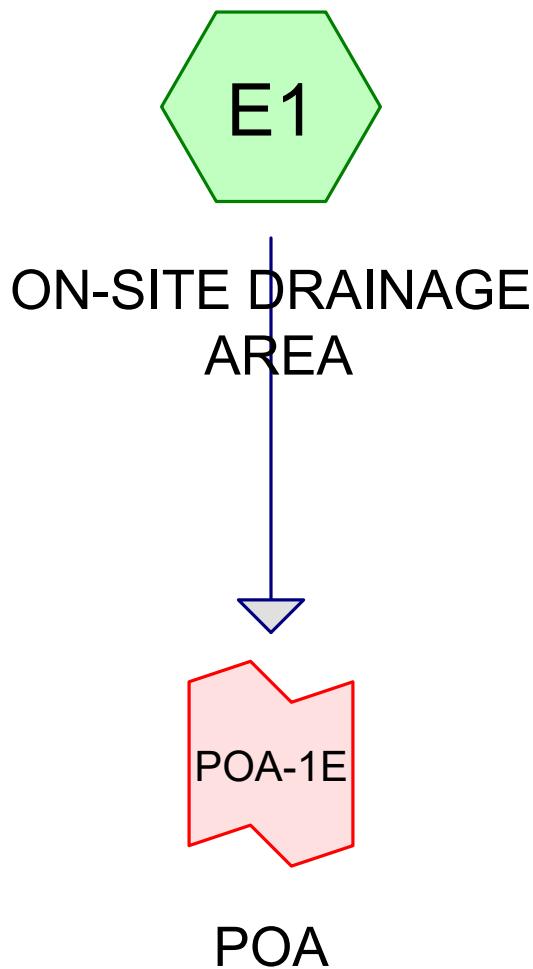


Figure 4: FEMA Map  
Township of North Brunswick – Freddy's

## Appendix B

### Existing & Proposed Hydrographs Existing vs. Proposed Conditions Comparison Analysis

# **EXISTING CONDITIONS**



**Routing Diagram for 230407- Freddys**  
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**230407- Freddys**

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**Area Listing (selected nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
0.040	80	>75% Grass cover, Good, HSG D (E1)
1.240	98	Paved parking, HSG D (E1)
<b>1.280</b>	<b>97</b>	<b>TOTAL AREA</b>

**230407- Freddys**

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**Soil Listing (selected nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
1.280	HSG D	E1
0.000	Other	
<b>1.280</b>		<b>TOTAL AREA</b>

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**Ground Covers (selected nodes)**

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.040	0.000	0.040	>75% Grass cover, Good	E1
0.000	0.000	0.000	1.240	0.000	1.240	Paved parking	E1
<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>1.280</b>	<b>0.000</b>	<b>1.280</b>	<b>TOTAL AREA</b>	

**230407- Freddys**

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NOAA 24-hr D 25-YR Rainfall=6.36"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentE1: ON-SITE DRAINAGE** Runoff Area=1.280 ac 96.88% Impervious Runoff Depth=6.06"  
Flow Length=381' Tc=2.7 min CN=80/98 Runoff=8.426 cfs 0.646 af

**Link POA-1E: POA**

Inflow=8.426 cfs 0.646 af  
Primary=8.426 cfs 0.646 af

**Total Runoff Area = 1.280 ac Runoff Volume = 0.646 af Average Runoff Depth = 6.06"**  
**3.13% Pervious = 0.040 ac 96.88% Impervious = 1.240 ac**

## Summary for Subcatchment E1: ON-SITE DRAINAGE AREA

Runoff = 8.426 cfs @ 12.10 hrs, Volume= 0.646 af, Depth= 6.06"  
 Routed to Link POA-1E : POA

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 25-YR Rainfall=6.36"

Area (ac)	CN	Description
1.240	98	Paved parking, HSG D
0.040	80	>75% Grass cover, Good, HSG D
1.280	97	Weighted Average
0.040	80	3.13% Pervious Area
1.240	98	96.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	39	0.0135	0.99		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 3.31"
1.1	131	0.0103	2.06		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
0.3	70	0.0050	4.21	8.419	<b>Pipe Channel, Trench Drain</b> 24.0" x 12.0" Box Area= 2.0 sf Perim= 6.0' r= 0.33' n= 0.012 Concrete pipe, finished
0.1	12	0.0050	1.82	0.159	<b>Pipe Channel, 4" PVC</b> 4.0" Round Area= 0.1 sf Perim= 1.0' r= 0.08' n= 0.011 PVC, smooth interior
0.5	129	0.0032	4.07	12.797	<b>Pipe Channel,</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
2.7	381	Total			

**230407- Freddys**

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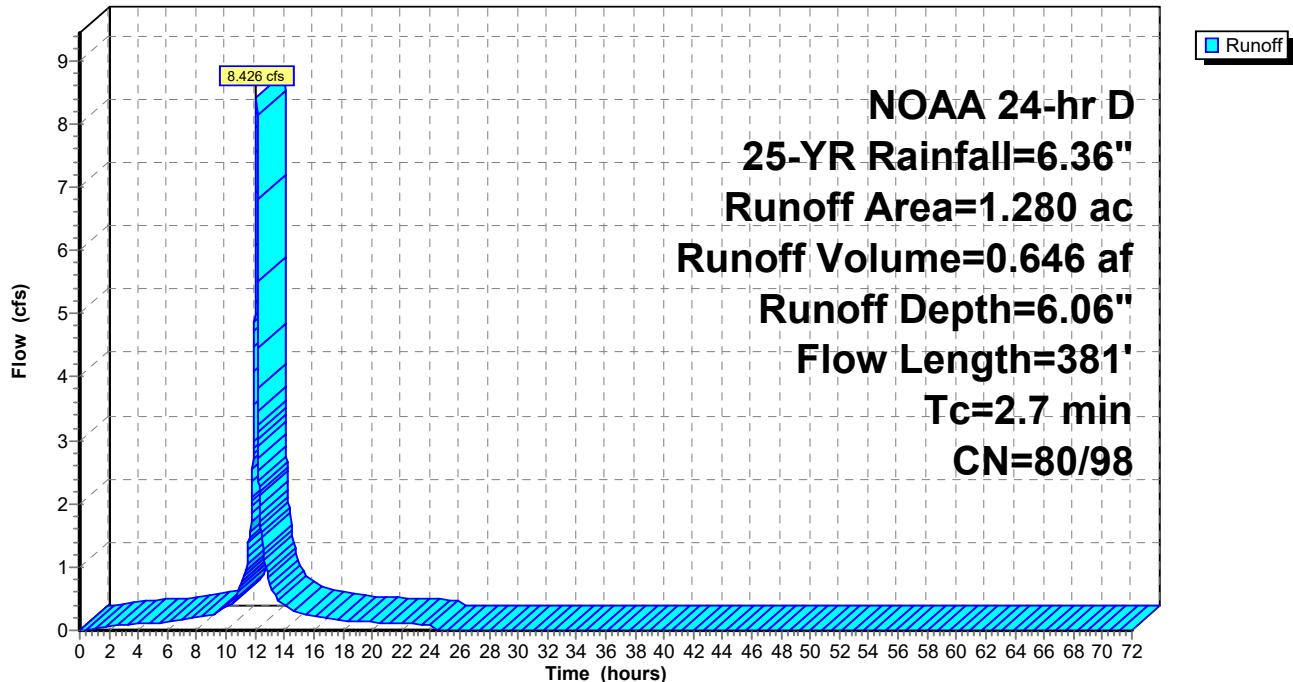
*NOAA 24-hr D 25-YR Rainfall=6.36"*

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### **Subcatchment E1: ON-SITE DRAINAGE AREA**

**Hydrograph**



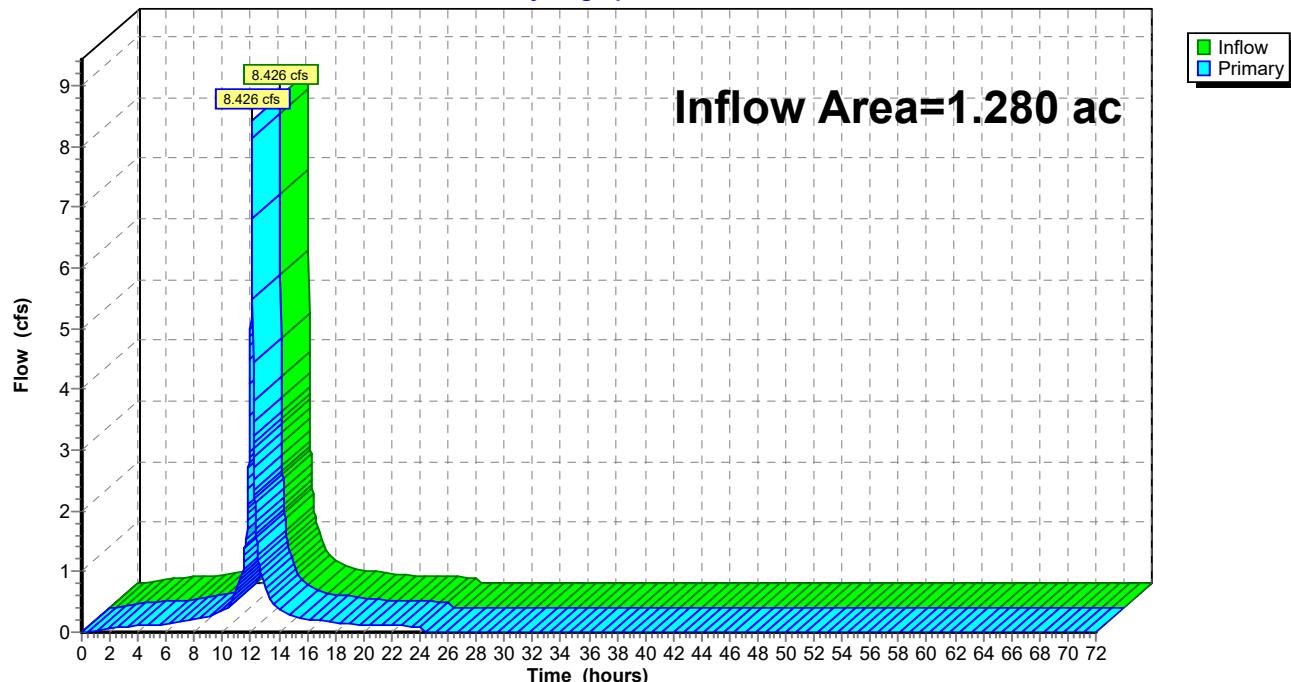
### Summary for Link POA-1E: POA

Inflow Area = 1.280 ac, 96.88% Impervious, Inflow Depth = 6.06" for 25-YR event  
Inflow = 8.426 cfs @ 12.10 hrs, Volume= 0.646 af  
Primary = 8.426 cfs @ 12.10 hrs, Volume= 0.646 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

### Link POA-1E: POA

Hydrograph



**230407- Freddys**

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*NOAA 24-hr D A-2-YR Rainfall=3.35"*

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentE1: ON-SITE DRAINAGE** Runoff Area=1.280 ac 96.88% Impervious Runoff Depth=3.07"  
Flow Length=381' Tc=2.7 min CN=80/98 Runoff=4.375 cfs 0.327 af

**Link POA-1E: POA**

Inflow=4.375 cfs 0.327 af  
Primary=4.375 cfs 0.327 af

**Total Runoff Area = 1.280 ac Runoff Volume = 0.327 af Average Runoff Depth = 3.07"**  
**3.13% Pervious = 0.040 ac 96.88% Impervious = 1.240 ac**

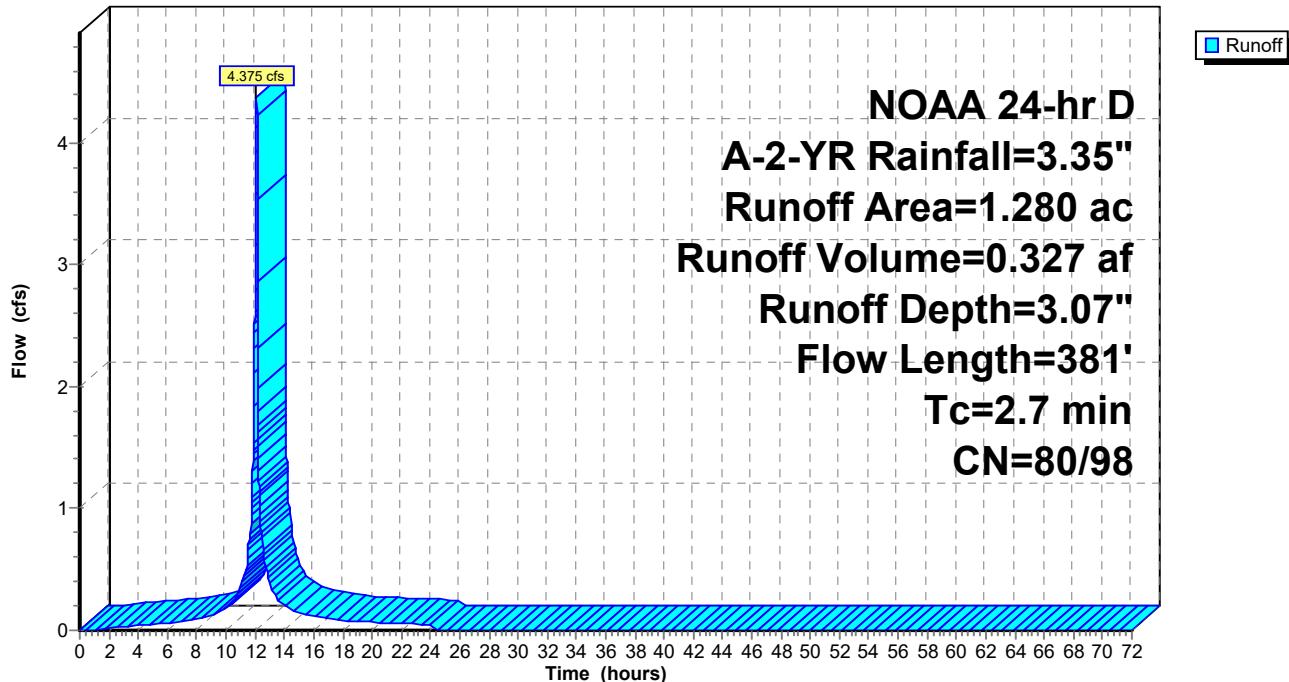
## Summary for Subcatchment E1: ON-SITE DRAINAGE AREA

Runoff = 4.375 cfs @ 12.10 hrs, Volume= 0.327 af, Depth= 3.07"  
 Routed to Link POA-1E : POA

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D A-2-YR Rainfall=3.35"

Area (ac)	CN	Description
1.240	98	Paved parking, HSG D
0.040	80	>75% Grass cover, Good, HSG D
1.280	97	Weighted Average
0.040	80	3.13% Pervious Area
1.240	98	96.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	39	0.0135	0.99		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 3.31"
1.1	131	0.0103	2.06		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
0.3	70	0.0050	4.21	8.419	<b>Pipe Channel, Trench Drain</b> 24.0" x 12.0" Box Area= 2.0 sf Perim= 6.0' r= 0.33' n= 0.012 Concrete pipe, finished
0.1	12	0.0050	1.82	0.159	<b>Pipe Channel, 4" PVC</b> 4.0" Round Area= 0.1 sf Perim= 1.0' r= 0.08' n= 0.011 PVC, smooth interior
0.5	129	0.0032	4.07	12.797	<b>Pipe Channel,</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
2.7	381	Total			

**Subcatchment E1: ON-SITE DRAINAGE AREA****Hydrograph**

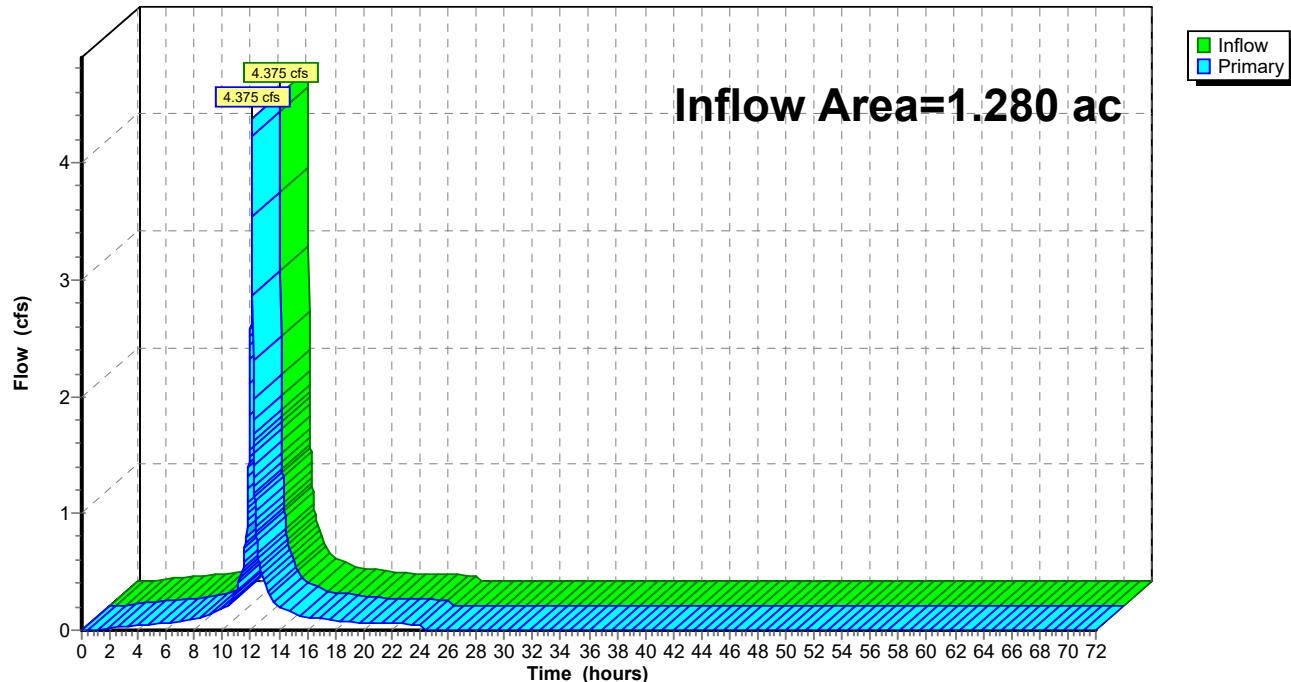
### Summary for Link POA-1E: POA

Inflow Area = 1.280 ac, 96.88% Impervious, Inflow Depth = 3.07" for A-2-YR event  
Inflow = 4.375 cfs @ 12.10 hrs, Volume= 0.327 af  
Primary = 4.375 cfs @ 12.10 hrs, Volume= 0.327 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

### Link POA-1E: POA

Hydrograph



**230407- Freddys**

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*NOAA 24-hr D B-10-YR Rainfall=5.12"*

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentE1: ON-SITE DRAINAGE** Runoff Area=1.280 ac 96.88% Impervious Runoff Depth=4.82"  
Flow Length=381' Tc=2.7 min CN=80/98 Runoff=6.759 cfs 0.515 af

**Link POA-1E: POA**

Inflow=6.759 cfs 0.515 af  
Primary=6.759 cfs 0.515 af

**Total Runoff Area = 1.280 ac Runoff Volume = 0.515 af Average Runoff Depth = 4.82"**  
**3.13% Pervious = 0.040 ac 96.88% Impervious = 1.240 ac**

**230407- Freddys**

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NOAA 24-hr D B-10-YR Rainfall=5.12"

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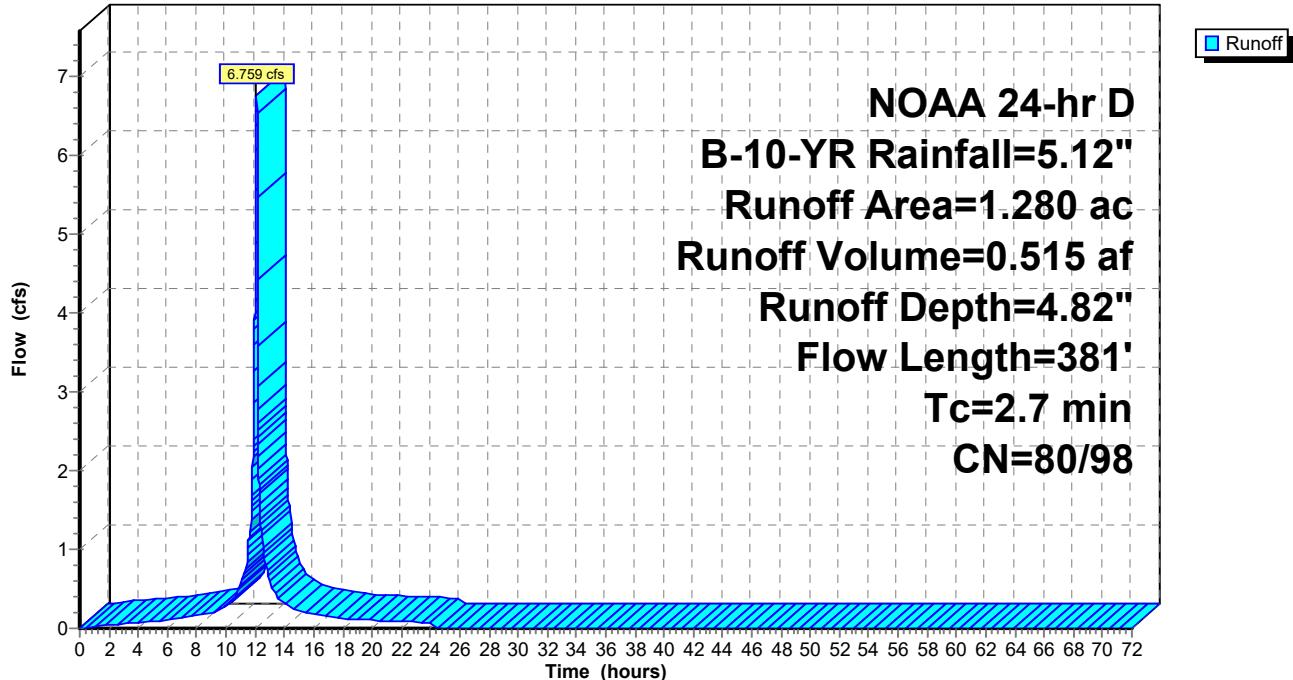
**Summary for Subcatchment E1: ON-SITE DRAINAGE AREA**

Runoff = 6.759 cfs @ 12.10 hrs, Volume= 0.515 af, Depth= 4.82"  
 Routed to Link POA-1E : POA

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D B-10-YR Rainfall=5.12"

Area (ac)	CN	Description
1.240	98	Paved parking, HSG D
0.040	80	>75% Grass cover, Good, HSG D
1.280	97	Weighted Average
0.040	80	3.13% Pervious Area
1.240	98	96.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
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0.3	70	0.0050	4.21	8.419	<b>Pipe Channel, Trench Drain</b> 24.0" x 12.0" Box Area= 2.0 sf Perim= 6.0' r= 0.33' n= 0.012 Concrete pipe, finished
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2.7	381	Total			

**Subcatchment E1: ON-SITE DRAINAGE AREA****Hydrograph**

### Summary for Link POA-1E: POA

Inflow Area = 1.280 ac, 96.88% Impervious, Inflow Depth = 4.82" for B-10-YR event

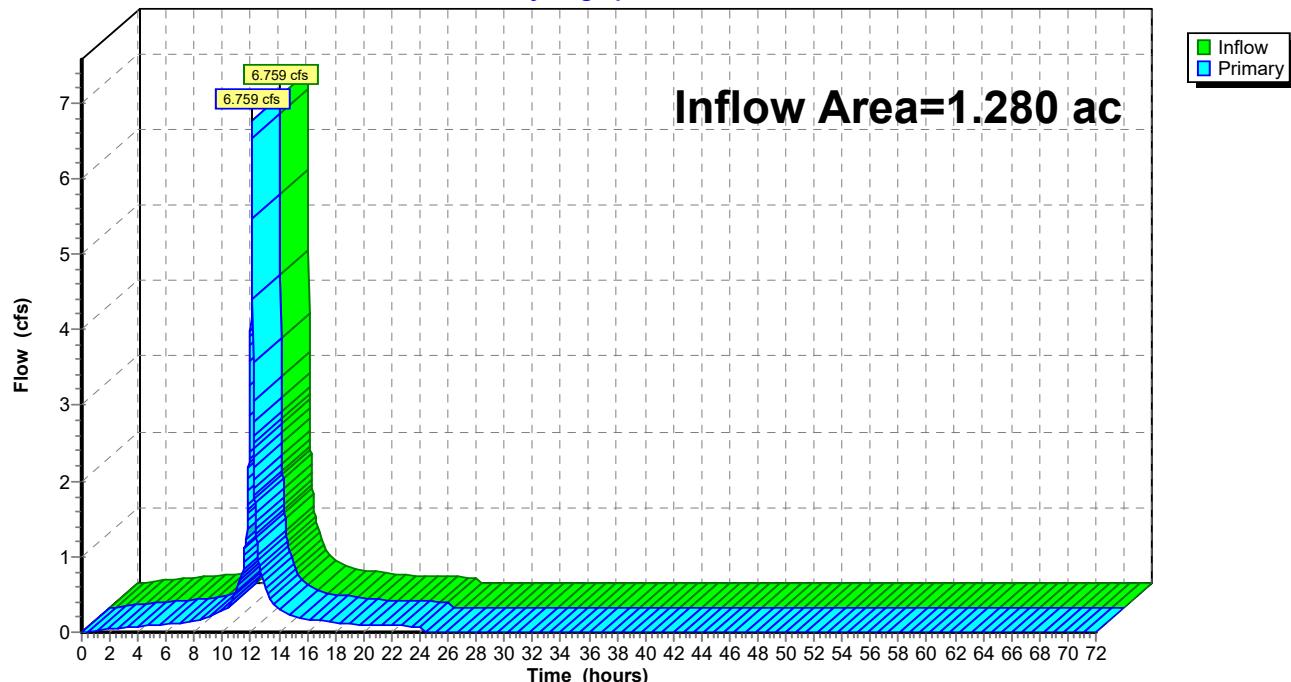
Inflow = 6.759 cfs @ 12.10 hrs, Volume= 0.515 af

Primary = 6.759 cfs @ 12.10 hrs, Volume= 0.515 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

### Link POA-1E: POA

Hydrograph



**230407- Freddys**

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*NOAA 24-hr D C-100-YR Rainfall=8.63"*

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentE1: ON-SITE DRAINAGE** Runoff Area=1.280 ac 96.88% Impervious Runoff Depth=8.32"  
Flow Length=381' Tc=2.7 min CN=80/98 Runoff=11.475 cfs 0.888 af

**Link POA-1E: POA**

Inflow=11.475 cfs 0.888 af  
Primary=11.475 cfs 0.888 af

**Total Runoff Area = 1.280 ac Runoff Volume = 0.888 af Average Runoff Depth = 8.32"**  
**3.13% Pervious = 0.040 ac 96.88% Impervious = 1.240 ac**

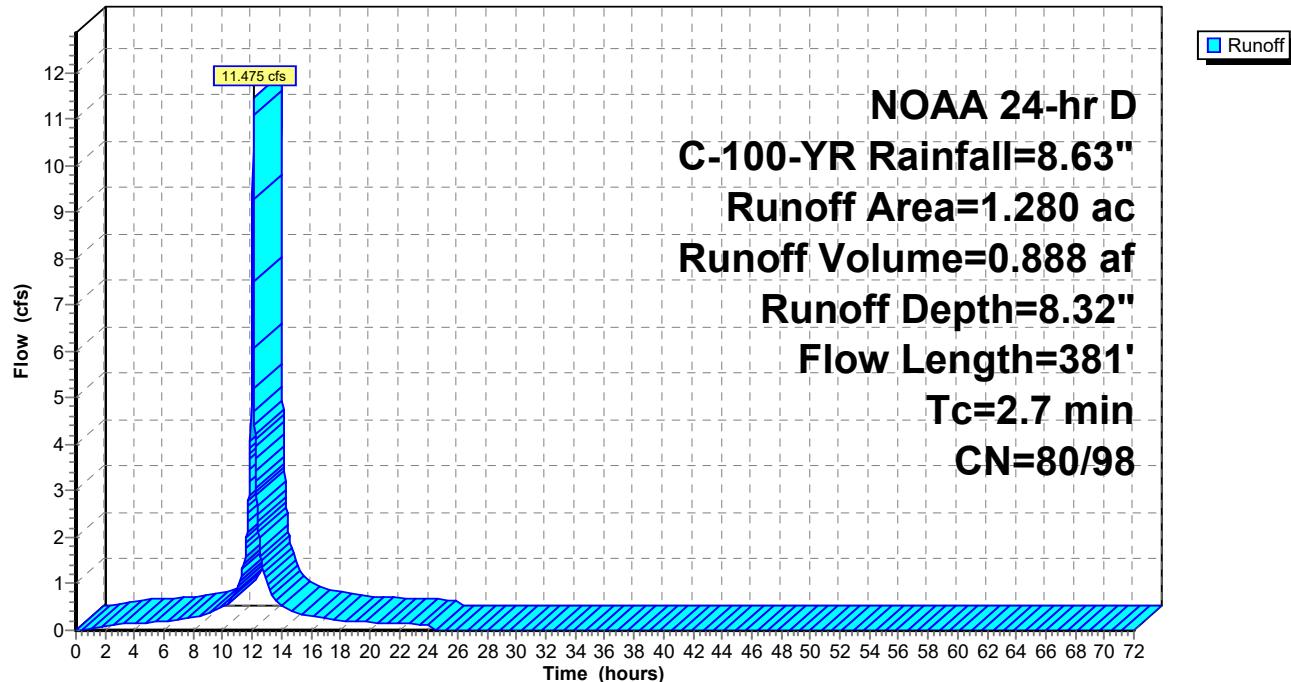
## Summary for Subcatchment E1: ON-SITE DRAINAGE AREA

Runoff = 11.475 cfs @ 12.10 hrs, Volume= 0.888 af, Depth= 8.32"  
 Routed to Link POA-1E : POA

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D C-100-YR Rainfall=8.63"

Area (ac)	CN	Description
1.240	98	Paved parking, HSG D
0.040	80	>75% Grass cover, Good, HSG D
1.280	97	Weighted Average
0.040	80	3.13% Pervious Area
1.240	98	96.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	39	0.0135	0.99		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 3.31"
1.1	131	0.0103	2.06		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
0.3	70	0.0050	4.21	8.419	<b>Pipe Channel, Trench Drain</b> 24.0" x 12.0" Box Area= 2.0 sf Perim= 6.0' r= 0.33' n= 0.012 Concrete pipe, finished
0.1	12	0.0050	1.82	0.159	<b>Pipe Channel, 4" PVC</b> 4.0" Round Area= 0.1 sf Perim= 1.0' r= 0.08' n= 0.011 PVC, smooth interior
0.5	129	0.0032	4.07	12.797	<b>Pipe Channel,</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
2.7	381	Total			

**Subcatchment E1: ON-SITE DRAINAGE AREA****Hydrograph**

### Summary for Link POA-1E: POA

Inflow Area = 1.280 ac, 96.88% Impervious, Inflow Depth = 8.32" for C-100-YR event

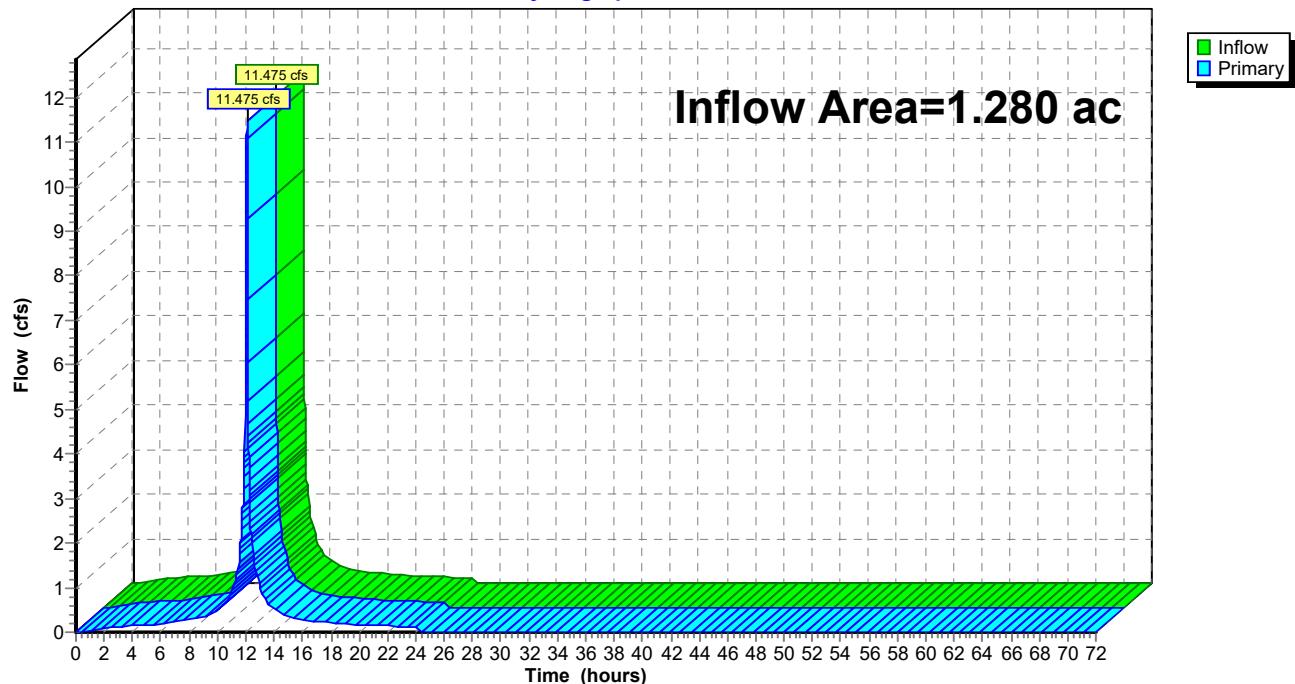
Inflow = 11.475 cfs @ 12.10 hrs, Volume= 0.888 af

Primary = 11.475 cfs @ 12.10 hrs, Volume= 0.888 af, Atten= 0%, Lag= 0.0 min

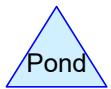
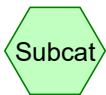
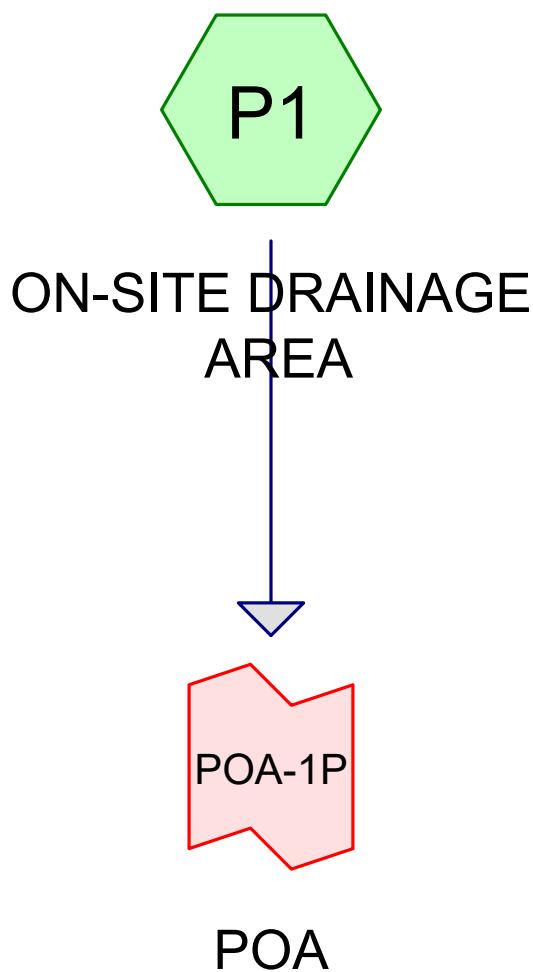
Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

### Link POA-1E: POA

Hydrograph



# **PROPOSED** **CONDITIONS**



**Routing Diagram for 230407- Freddys**  
Prepared by Colliers Engineering & Design, Printed 4/28/2023  
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**230407- Freddys**

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**Area Listing (selected nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
0.070	80	>75% Grass cover, Good, HSG D (P1)
1.210	98	Paved parking, HSG D (P1)
<b>1.280</b>	<b>97</b>	<b>TOTAL AREA</b>

**230407- Freddys**

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**Soil Listing (selected nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
1.280	HSG D	P1
0.000	Other	
<b>1.280</b>		<b>TOTAL AREA</b>

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**Ground Covers (selected nodes)**

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.070	0.000	0.070	>75% Grass cover, Good	P1
0.000	0.000	0.000	1.210	0.000	1.210	Paved parking	P1
<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>1.280</b>	<b>0.000</b>	<b>1.280</b>	<b>TOTAL AREA</b>	

**230407- Freddys**

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NOAA 24-hr D 25-YR Rainfall=6.36"

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentP1: ON-SITE DRAINAGE** Runoff Area=1.280 ac 94.53% Impervious Runoff Depth=6.01"  
Flow Length=427' Tc=2.8 min CN=80/98 Runoff=8.371 cfs 0.641 af

**Link POA-1P: POA**

Inflow=8.371 cfs 0.641 af  
Primary=8.371 cfs 0.641 af

**Total Runoff Area = 1.280 ac Runoff Volume = 0.641 af Average Runoff Depth = 6.01"**  
**5.47% Pervious = 0.070 ac 94.53% Impervious = 1.210 ac**

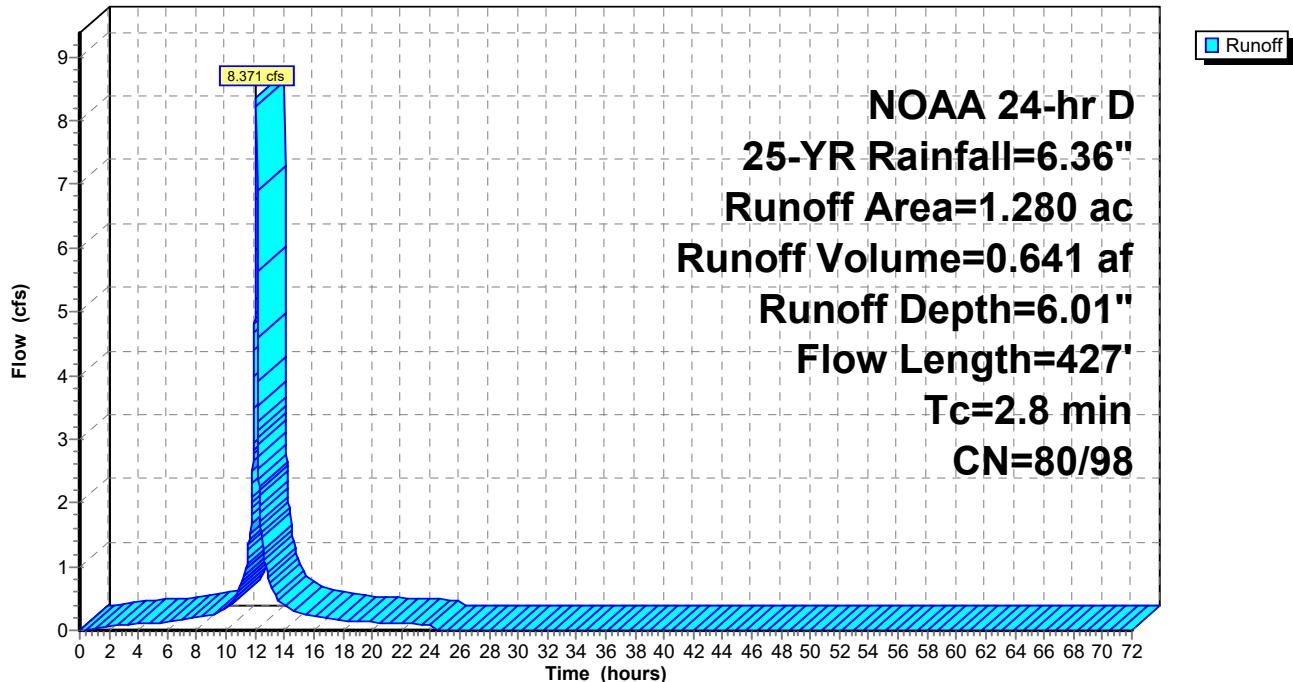
## Summary for Subcatchment P1: ON-SITE DRAINAGE AREA

Runoff = 8.371 cfs @ 12.10 hrs, Volume= 0.641 af, Depth= 6.01"  
 Routed to Link POA-1P : POA

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D 25-YR Rainfall=6.36"

Area (ac)	CN	Description
1.210	98	Paved parking, HSG D
0.070	80	>75% Grass cover, Good, HSG D
1.280	97	Weighted Average
0.070	80	5.47% Pervious Area
1.210	98	94.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	83	0.0132	1.14		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 3.31"
0.5	67	0.0142	2.42		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
0.4	84	0.0050	3.72	4.568	<b>Pipe Channel,</b> 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Concrete pipe, straight & clean
0.2	64	0.0045	4.83	15.176	<b>Pipe Channel,</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
0.5	129	0.0032	4.41	13.864	<b>Pipe Channel,</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
2.8	427	Total			

**Subcatchment P1: ON-SITE DRAINAGE AREA****Hydrograph**

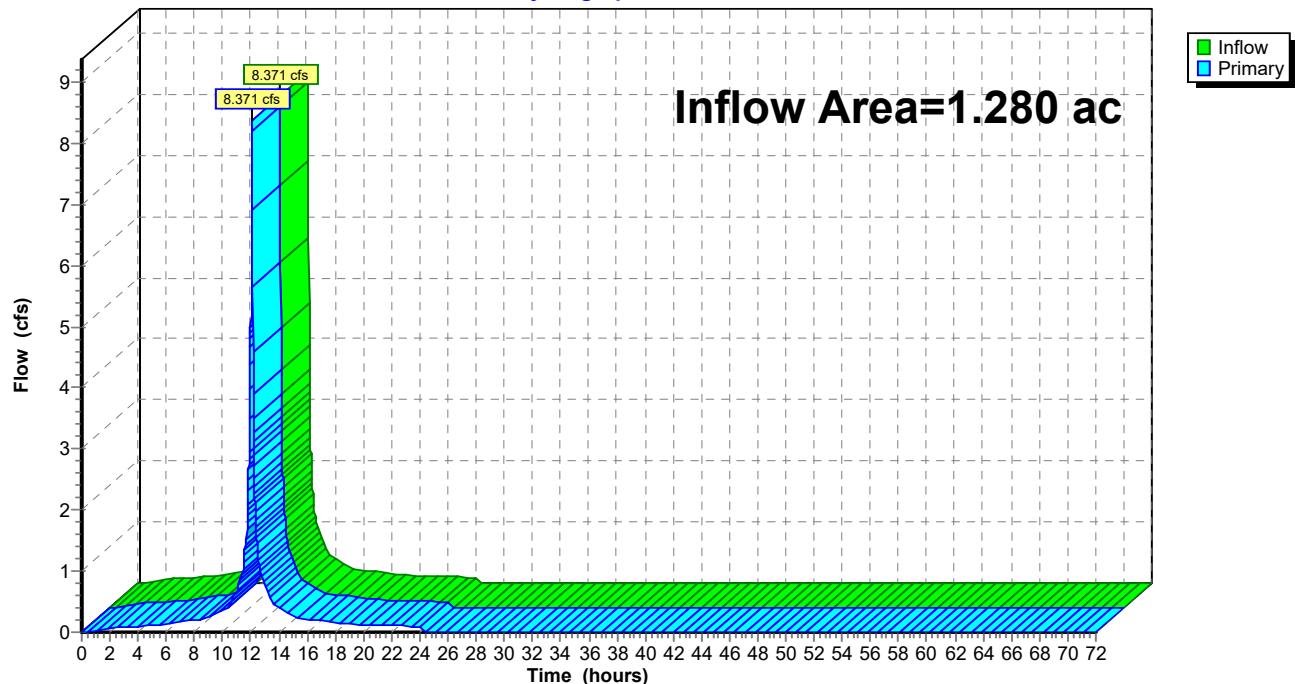
### Summary for Link POA-1P: POA

Inflow Area = 1.280 ac, 94.53% Impervious, Inflow Depth = 6.01" for 25-YR event  
Inflow = 8.371 cfs @ 12.10 hrs, Volume= 0.641 af  
Primary = 8.371 cfs @ 12.10 hrs, Volume= 0.641 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

### Link POA-1P: POA

Hydrograph



**230407- Freddys**

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*NOAA 24-hr D A-2-YR Rainfall=3.35"*

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentP1: ON-SITE DRAINAGE** Runoff Area=1.280 ac 94.53% Impervious Runoff Depth=3.03"  
Flow Length=427' Tc=2.8 min CN=80/98 Runoff=4.324 cfs 0.323 af

**Link POA-1P: POA**

Inflow=4.324 cfs 0.323 af  
Primary=4.324 cfs 0.323 af

**Total Runoff Area = 1.280 ac Runoff Volume = 0.323 af Average Runoff Depth = 3.03"**  
**5.47% Pervious = 0.070 ac 94.53% Impervious = 1.210 ac**

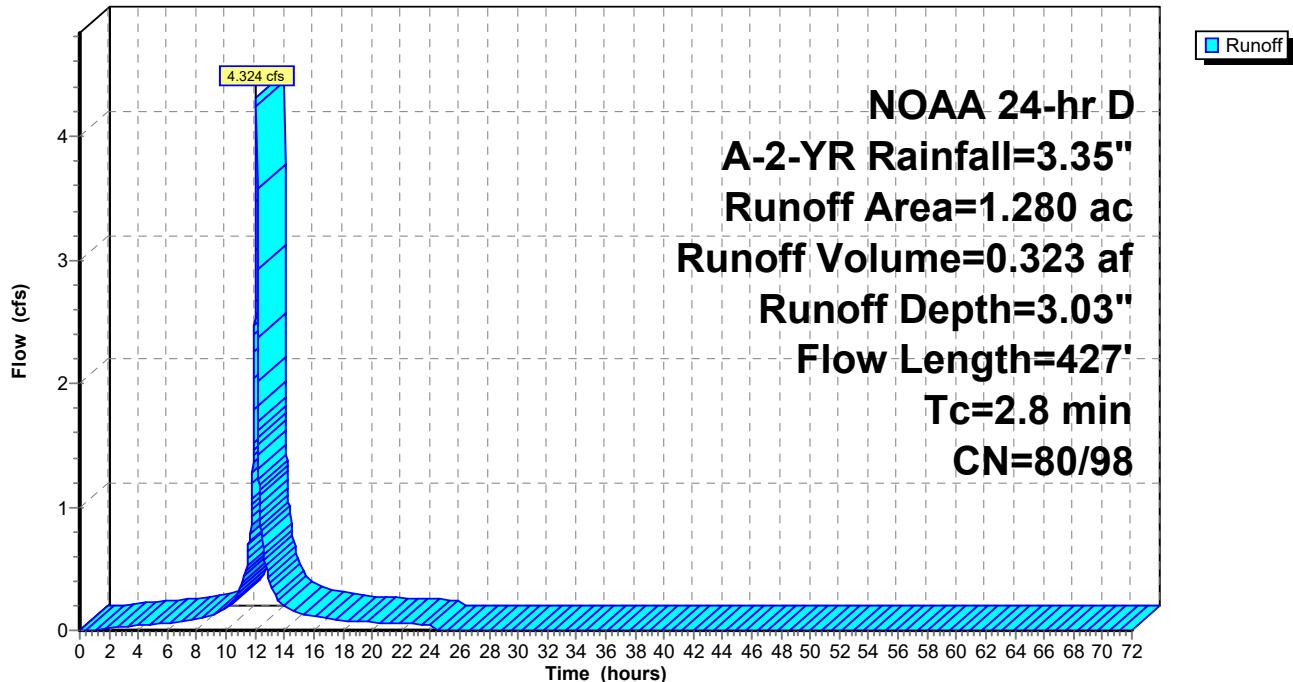
## Summary for Subcatchment P1: ON-SITE DRAINAGE AREA

Runoff = 4.324 cfs @ 12.10 hrs, Volume= 0.323 af, Depth= 3.03"  
 Routed to Link POA-1P : POA

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D A-2-YR Rainfall=3.35"

Area (ac)	CN	Description
1.210	98	Paved parking, HSG D
0.070	80	>75% Grass cover, Good, HSG D
1.280	97	Weighted Average
0.070	80	5.47% Pervious Area
1.210	98	94.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	83	0.0132	1.14		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 3.31"
0.5	67	0.0142	2.42		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
0.4	84	0.0050	3.72	4.568	<b>Pipe Channel,</b> 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Concrete pipe, straight & clean
0.2	64	0.0045	4.83	15.176	<b>Pipe Channel,</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
0.5	129	0.0032	4.41	13.864	<b>Pipe Channel,</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
2.8	427	Total			

**Subcatchment P1: ON-SITE DRAINAGE AREA****Hydrograph**

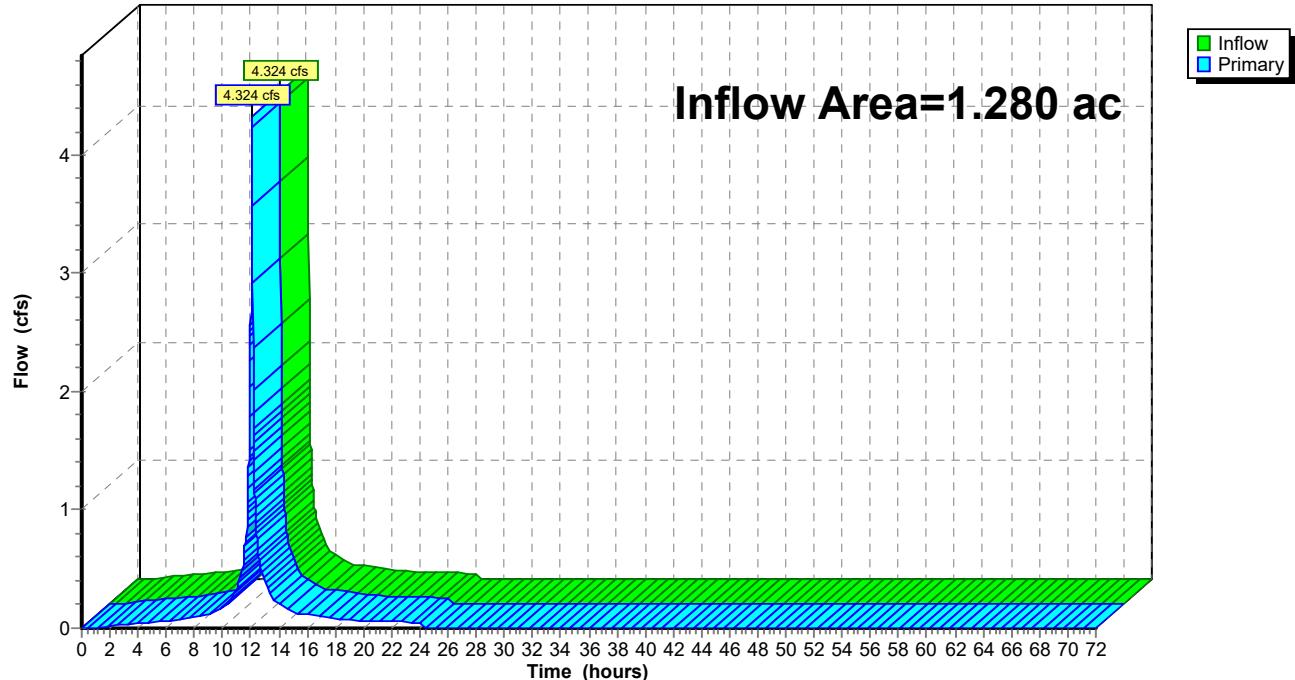
### Summary for Link POA-1P: POA

Inflow Area = 1.280 ac, 94.53% Impervious, Inflow Depth = 3.03" for A-2-YR event  
Inflow = 4.324 cfs @ 12.10 hrs, Volume= 0.323 af  
Primary = 4.324 cfs @ 12.10 hrs, Volume= 0.323 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

### Link POA-1P: POA

Hydrograph



**230407- Freddys**

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*NOAA 24-hr D B-10-YR Rainfall=5.12"*

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points  
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.  
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentP1: ON-SITE DRAINAGE** Runoff Area=1.280 ac 94.53% Impervious Runoff Depth=4.78"  
Flow Length=427' Tc=2.8 min CN=80/98 Runoff=6.704 cfs 0.510 af

**Link POA-1P: POA**

Inflow=6.704 cfs 0.510 af  
Primary=6.704 cfs 0.510 af

**Total Runoff Area = 1.280 ac Runoff Volume = 0.510 af Average Runoff Depth = 4.78"**  
**5.47% Pervious = 0.070 ac 94.53% Impervious = 1.210 ac**

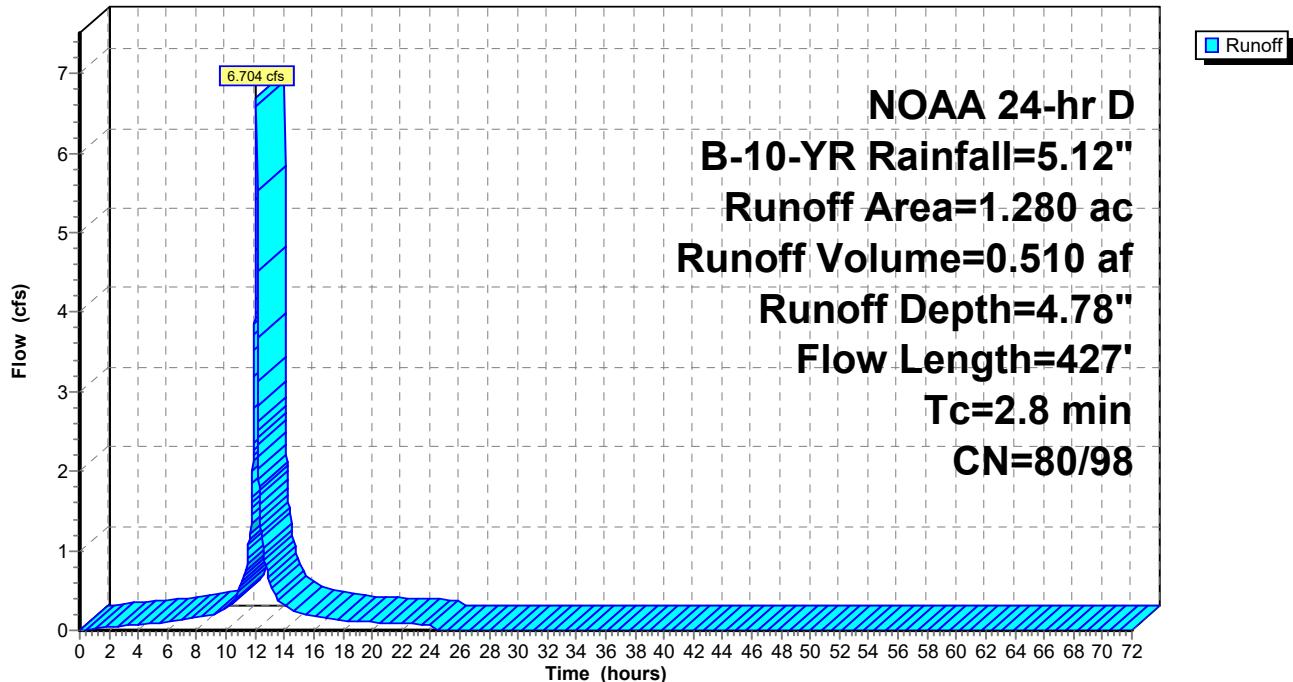
## Summary for Subcatchment P1: ON-SITE DRAINAGE AREA

Runoff = 6.704 cfs @ 12.10 hrs, Volume= 0.510 af, Depth= 4.78"  
 Routed to Link POA-1P : POA

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D B-10-YR Rainfall=5.12"

Area (ac)	CN	Description
1.210	98	Paved parking, HSG D
0.070	80	>75% Grass cover, Good, HSG D
1.280	97	Weighted Average
0.070	80	5.47% Pervious Area
1.210	98	94.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	83	0.0132	1.14		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 3.31"
0.5	67	0.0142	2.42		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
0.4	84	0.0050	3.72	4.568	<b>Pipe Channel,</b> 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Concrete pipe, straight & clean
0.2	64	0.0045	4.83	15.176	<b>Pipe Channel,</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
0.5	129	0.0032	4.41	13.864	<b>Pipe Channel,</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
2.8	427	Total			

**Subcatchment P1: ON-SITE DRAINAGE AREA****Hydrograph**

### Summary for Link POA-1P: POA

Inflow Area = 1.280 ac, 94.53% Impervious, Inflow Depth = 4.78" for B-10-YR event

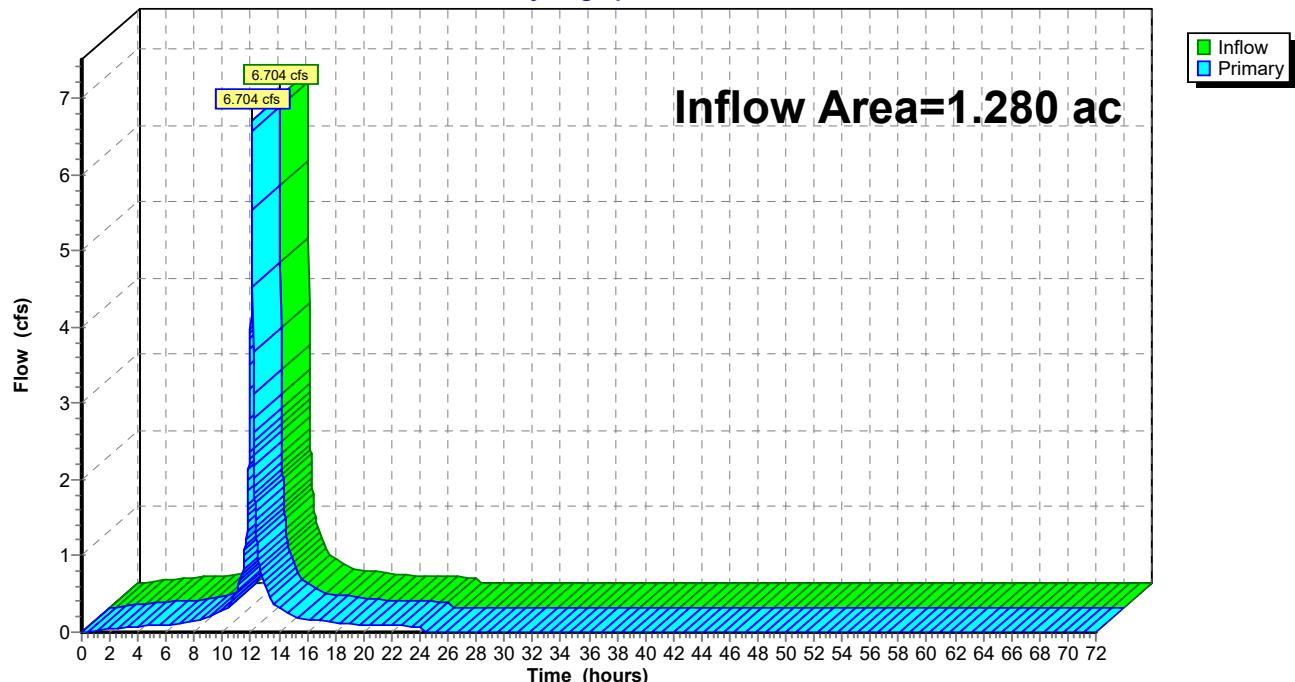
Inflow = 6.704 cfs @ 12.10 hrs, Volume= 0.510 af

Primary = 6.704 cfs @ 12.10 hrs, Volume= 0.510 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

### Link POA-1P: POA

Hydrograph



**230407- Freddys**

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*NOAA 24-hr D C-100-YR Rainfall=8.63"*

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Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**SubcatchmentP1: ON-SITE DRAINAGE** Runoff Area=1.280 ac 94.53% Impervious Runoff Depth=8.27"  
Flow Length=427' Tc=2.8 min CN=80/98 Runoff=11.419 cfs 0.882 af

**Link POA-1P: POA**

Inflow=11.419 cfs 0.882 af

Primary=11.419 cfs 0.882 af

**Total Runoff Area = 1.280 ac Runoff Volume = 0.882 af Average Runoff Depth = 8.27"**  
**5.47% Pervious = 0.070 ac 94.53% Impervious = 1.210 ac**

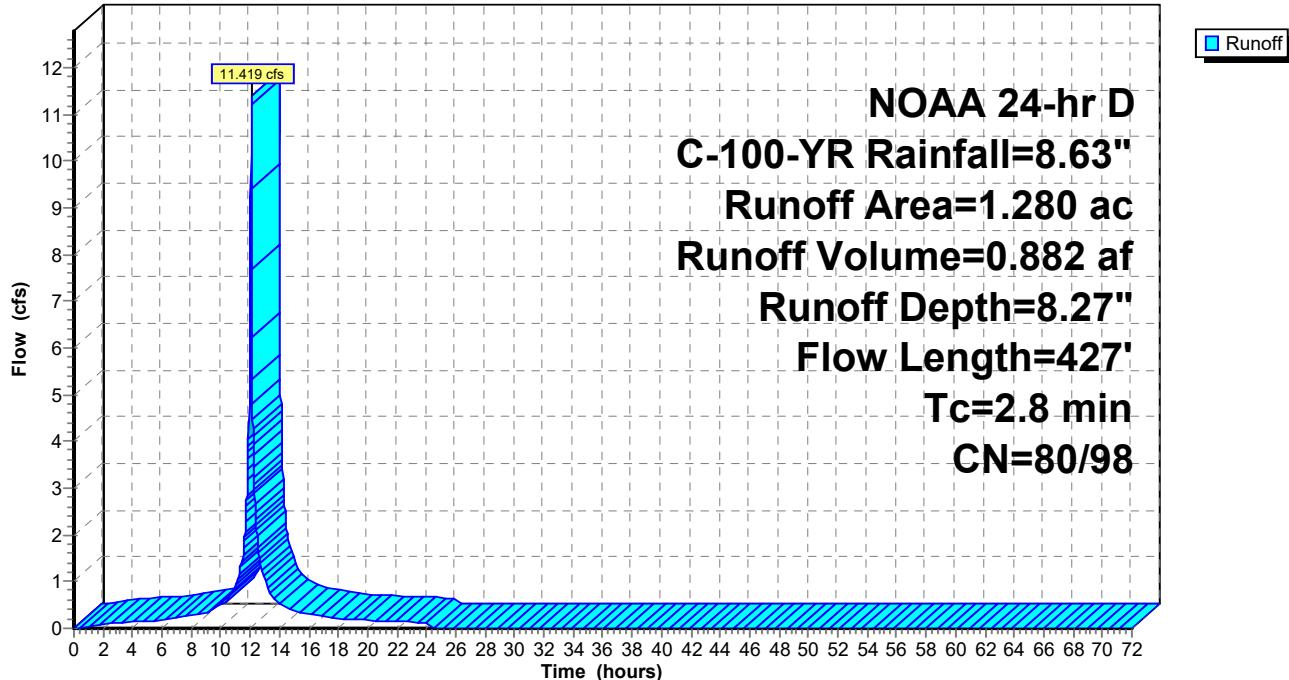
## Summary for Subcatchment P1: ON-SITE DRAINAGE AREA

Runoff = 11.419 cfs @ 12.10 hrs, Volume= 0.882 af, Depth= 8.27"  
 Routed to Link POA-1P : POA

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 NOAA 24-hr D C-100-YR Rainfall=8.63"

Area (ac)	CN	Description
1.210	98	Paved parking, HSG D
0.070	80	>75% Grass cover, Good, HSG D
1.280	97	Weighted Average
0.070	80	5.47% Pervious Area
1.210	98	94.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	83	0.0132	1.14		<b>Sheet Flow,</b> Smooth surfaces n= 0.011 P2= 3.31"
0.5	67	0.0142	2.42		<b>Shallow Concentrated Flow,</b> Paved Kv= 20.3 fps
0.4	84	0.0050	3.72	4.568	<b>Pipe Channel,</b> 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Concrete pipe, straight & clean
0.2	64	0.0045	4.83	15.176	<b>Pipe Channel,</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013
0.5	129	0.0032	4.41	13.864	<b>Pipe Channel,</b> 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.012
2.8	427	Total			

**Subcatchment P1: ON-SITE DRAINAGE AREA****Hydrograph**

### Summary for Link POA-1P: POA

Inflow Area = 1.280 ac, 94.53% Impervious, Inflow Depth = 8.27" for C-100-YR event

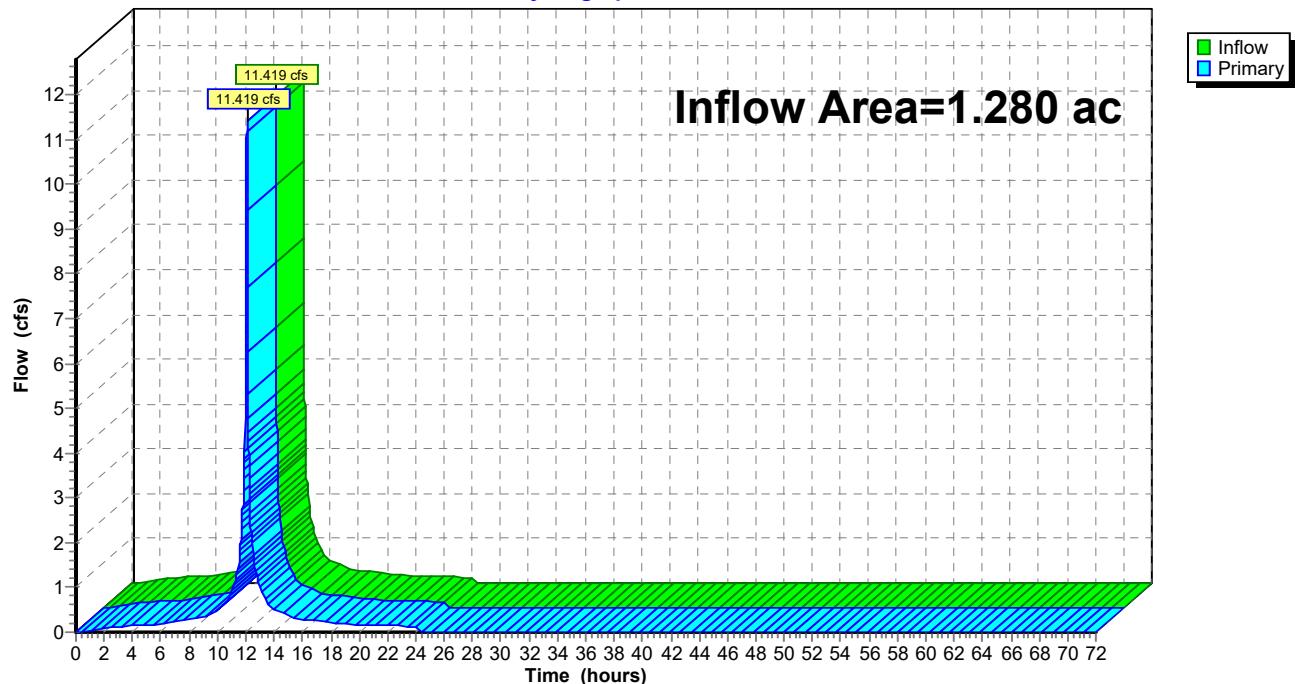
Inflow = 11.419 cfs @ 12.10 hrs, Volume= 0.882 af

Primary = 11.419 cfs @ 12.10 hrs, Volume= 0.882 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

### Link POA-1P: POA

Hydrograph



**230407- Freddys**

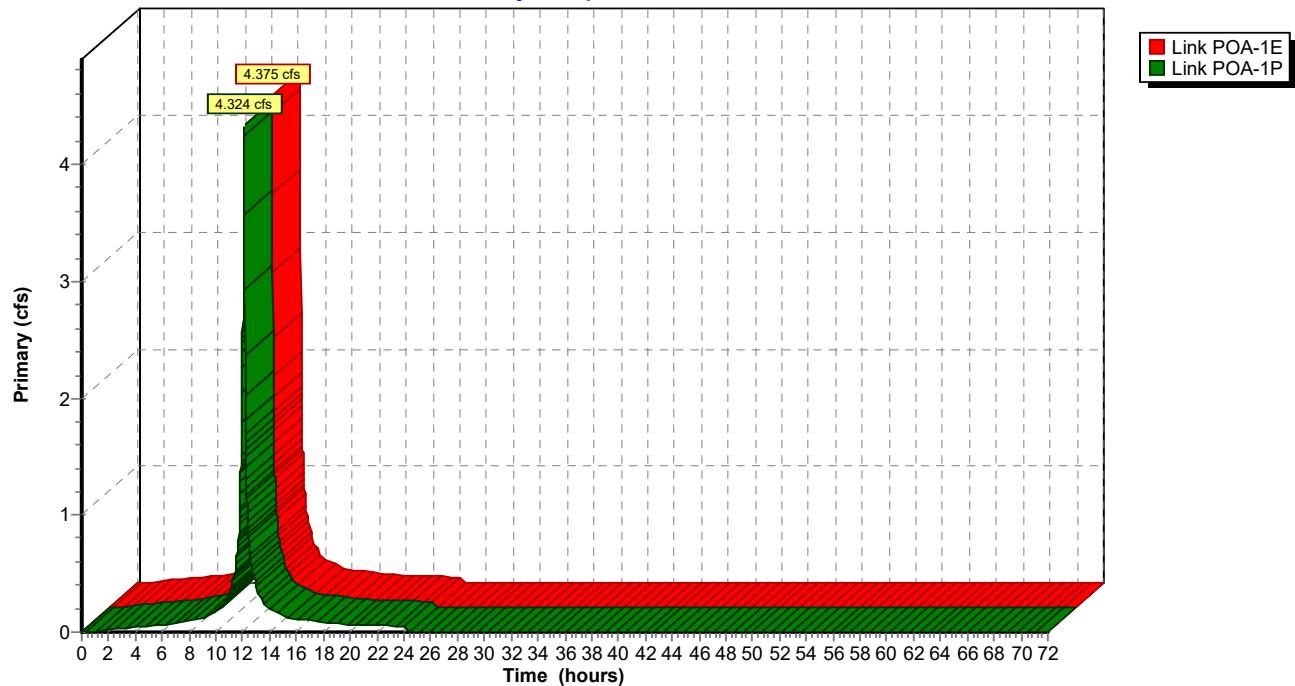
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NOAA 24-hr D A-2-YR Rainfall=3.35"

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**Primary Comparison**



**230407- Freddys**

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NOAA 24-hr D A-2-YR Rainfall=3.35"

Printed 4/24/2023

**Primary Comparison**

Time (hours)	Link POA-1E (cfs)	Link POA-1P (cfs)	Time (hours)	Link POA-1E (cfs)	Link POA-1P (cfs)
0.00	0.000	0.000	5.20	0.052	0.050
0.10	0.000	0.000	5.30	0.053	0.051
0.20	0.000	0.000	5.40	0.053	0.052
0.30	0.000	0.000	5.50	0.054	0.053
0.40	0.000	0.000	5.60	0.055	0.053
0.50	0.000	0.000	5.70	0.056	0.054
0.60	0.000	0.000	5.80	0.057	0.055
0.70	0.000	0.000	5.90	0.057	0.056
0.80	0.000	0.000	6.00	0.058	0.057
0.90	0.000	0.000	6.10	0.060	0.059
1.00	0.000	0.000	6.20	0.062	0.060
1.10	0.000	0.000	6.30	0.064	0.062
1.20	0.002	0.002	6.40	0.066	0.064
1.30	0.004	0.004	6.50	0.067	0.066
1.40	0.006	0.006	6.60	0.070	0.068
1.50	0.007	0.007	6.70	0.071	0.070
1.60	0.009	0.009	6.80	0.074	0.072
1.70	0.011	0.011	6.90	0.075	0.074
1.80	0.013	0.012	7.00	0.078	0.076
1.90	0.014	0.014	7.10	0.079	0.077
2.00	0.016	0.015	7.20	0.082	0.080
2.10	0.017	0.017	7.30	0.083	0.081
2.20	0.019	0.018	7.40	0.086	0.084
2.30	0.020	0.020	7.50	0.087	0.085
2.40	0.022	0.021	7.60	0.089	0.087
2.50	0.023	0.022	7.70	0.092	0.089
2.60	0.024	0.024	7.80	0.094	0.091
2.70	0.026	0.025	7.90	0.095	0.093
2.80	0.027	0.026	8.00	0.098	0.095
2.90	0.028	0.028	8.10	0.100	0.097
3.00	0.029	0.029	8.20	0.102	0.099
3.10	0.031	0.030	8.30	0.103	0.101
3.20	0.032	0.031	8.40	0.106	0.104
3.30	0.033	0.032	8.50	0.108	0.105
3.40	0.034	0.033	8.60	0.110	0.107
3.50	0.035	0.035	8.70	0.112	0.109
3.60	0.036	0.035	8.80	0.114	0.111
3.70	0.038	0.037	8.90	0.116	0.113
3.80	0.038	0.037	9.00	0.118	0.115
3.90	0.040	0.039	9.10	0.125	0.122
4.00	0.041	0.040	9.20	0.131	0.128
4.10	0.042	0.041	9.30	0.138	0.135
4.20	0.042	0.041	9.40	0.144	0.141
4.30	0.043	0.042	9.50	0.151	0.147
4.40	0.045	0.044	9.60	0.157	0.154
4.50	0.045	0.044	9.70	0.164	0.160
4.60	0.046	0.045	9.80	0.171	0.167
4.70	0.047	0.046	9.90	0.177	0.174
4.80	0.048	0.047	10.00	0.184	0.180
4.90	0.049	0.048	10.10	0.191	0.187
5.00	0.050	0.049	10.20	0.197	0.193
5.10	0.051	0.049	10.30	0.205	0.201

**230407- Freddys**

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NOAA 24-hr D A-2-YR Rainfall=3.35"

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**Primary Comparison (continued)**

Time (hours)	Link POA-1E (cfs)	Link POA-1P (cfs)	Time (hours)	Link POA-1E (cfs)	Link POA-1P (cfs)
10.40	0.211	0.207	15.60	0.122	0.121
10.50	0.218	0.214	15.70	0.121	0.120
10.60	0.242	0.237	15.80	0.118	0.118
10.70	0.266	0.261	15.90	0.117	0.116
10.80	0.290	0.284	16.00	0.115	0.114
10.90	0.314	0.308	16.10	0.113	0.113
11.00	0.338	0.332	16.20	0.111	0.110
11.10	0.381	0.374	16.30	0.109	0.109
11.20	0.423	0.415	16.40	0.107	0.107
11.30	0.466	0.458	16.50	0.105	0.104
11.40	0.509	0.501	16.60	0.103	0.103
11.50	0.552	0.543	16.70	0.102	0.101
11.60	0.744	0.731	16.80	0.100	0.099
11.70	0.788	0.776	16.90	0.098	0.097
11.80	1.081	1.064	17.00	0.096	0.095
11.90	1.506	1.484	17.10	0.094	0.093
12.00	2.605	2.570	17.20	0.092	0.091
12.10	<b>4.375</b>	<b>4.323</b>	17.30	0.090	0.090
12.20	1.584	1.580	17.40	0.088	0.088
12.30	1.115	1.107	17.50	0.086	0.086
12.40	0.813	0.808	17.60	0.084	0.084
12.50	0.769	0.764	17.70	0.083	0.082
12.60	0.575	0.571	17.80	0.081	0.080
12.70	0.529	0.525	17.90	0.079	0.078
12.80	0.486	0.483	18.00	0.077	0.077
12.90	0.443	0.440	18.10	0.075	0.074
13.00	0.400	0.397	18.20	0.074	0.074
13.10	0.356	0.354	18.30	0.074	0.074
13.20	0.332	0.329	18.40	0.074	0.073
13.30	0.307	0.305	18.50	0.073	0.072
13.40	0.282	0.281	18.60	0.073	0.072
13.50	0.258	0.256	18.70	0.072	0.071
13.60	0.233	0.232	18.80	0.072	0.071
13.70	0.226	0.224	18.90	0.071	0.071
13.80	0.220	0.218	19.00	0.071	0.070
13.90	0.212	0.211	19.10	0.070	0.070
14.00	0.206	0.205	19.20	0.070	0.069
14.10	0.199	0.198	19.30	0.069	0.069
14.20	0.192	0.191	19.40	0.068	0.068
14.30	0.186	0.185	19.50	0.068	0.068
14.40	0.179	0.178	19.60	0.068	0.067
14.50	0.172	0.171	19.70	0.068	0.067
14.60	0.166	0.165	19.80	0.067	0.066
14.70	0.159	0.158	19.90	0.066	0.066
14.80	0.152	0.151	20.00	0.066	0.066
14.90	0.145	0.144	20.10	0.065	0.065
15.00	0.139	0.138	20.20	0.065	0.065
15.10	0.132	0.131	20.30	0.064	0.064
15.20	0.130	0.129	20.40	0.064	0.064
15.30	0.128	0.127	20.50	0.063	0.063
15.40	0.126	0.126	20.60	0.063	0.063
15.50	0.124	0.124	20.70	0.062	0.062

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NOAA 24-hr D A-2-YR Rainfall=3.35"

Printed 4/24/2023

**Primary Comparison (continued)**

Time (hours)	Link POA-1E (cfs)	Link POA-1P (cfs)	Time (hours)	Link POA-1E (cfs)	Link POA-1P (cfs)
20.80	0.062	0.062	26.00	0.000	0.000
20.90	0.062	0.061	26.10	0.000	0.000
21.00	0.061	0.061	26.20	0.000	0.000
21.10	0.060	0.060	26.30	0.000	0.000
21.20	0.060	0.060	26.40	0.000	0.000
21.30	0.059	0.059	26.50	0.000	0.000
21.40	0.059	0.059	26.60	0.000	0.000
21.50	0.059	0.058	26.70	0.000	0.000
21.60	0.058	0.058	26.80	0.000	0.000
21.70	0.058	0.057	26.90	0.000	0.000
21.80	0.057	0.057	27.00	0.000	0.000
21.90	0.057	0.057	27.10	0.000	0.000
22.00	0.056	0.056	27.20	0.000	0.000
22.10	0.056	0.055	27.30	0.000	0.000
22.20	0.056	0.055	27.40	0.000	0.000
22.30	0.055	0.055	27.50	0.000	0.000
22.40	0.054	0.054	27.60	0.000	0.000
22.50	0.054	0.054	27.70	0.000	0.000
22.60	0.053	0.053	27.80	0.000	0.000
22.70	0.053	0.053	27.90	0.000	0.000
22.80	0.053	0.052	28.00	0.000	0.000
22.90	0.052	0.052	28.10	0.000	0.000
23.00	0.051	0.051	28.20	0.000	0.000
23.10	0.051	0.051	28.30	0.000	0.000
23.20	0.051	0.050	28.40	0.000	0.000
23.30	0.050	0.050	28.50	0.000	0.000
23.40	0.050	0.049	28.60	0.000	0.000
23.50	0.049	0.049	28.70	0.000	0.000
23.60	0.049	0.049	28.80	0.000	0.000
23.70	0.048	0.048	28.90	0.000	0.000
23.80	0.048	0.047	29.00	0.000	0.000
23.90	0.048	0.047	29.10	0.000	0.000
24.00	0.047	0.047	29.20	0.000	0.000
24.10	0.001	0.001	29.30	0.000	0.000
24.20	0.000	0.000	29.40	0.000	0.000
24.30	0.000	0.000	29.50	0.000	0.000
24.40	0.000	0.000	29.60	0.000	0.000
24.50	0.000	0.000	29.70	0.000	0.000
24.60	0.000	0.000	29.80	0.000	0.000
24.70	0.000	0.000	29.90	0.000	0.000
24.80	0.000	0.000	30.00	0.000	0.000
24.90	0.000	0.000	30.10	0.000	0.000
25.00	0.000	0.000	30.20	0.000	0.000
25.10	0.000	0.000	30.30	0.000	0.000
25.20	0.000	0.000	30.40	0.000	0.000
25.30	0.000	0.000	30.50	0.000	0.000
25.40	0.000	0.000	30.60	0.000	0.000
25.50	0.000	0.000	30.70	0.000	0.000
25.60	0.000	0.000	30.80	0.000	0.000
25.70	0.000	0.000	30.90	0.000	0.000
25.80	0.000	0.000	31.00	0.000	0.000
25.90	0.000	0.000	31.10	0.000	0.000

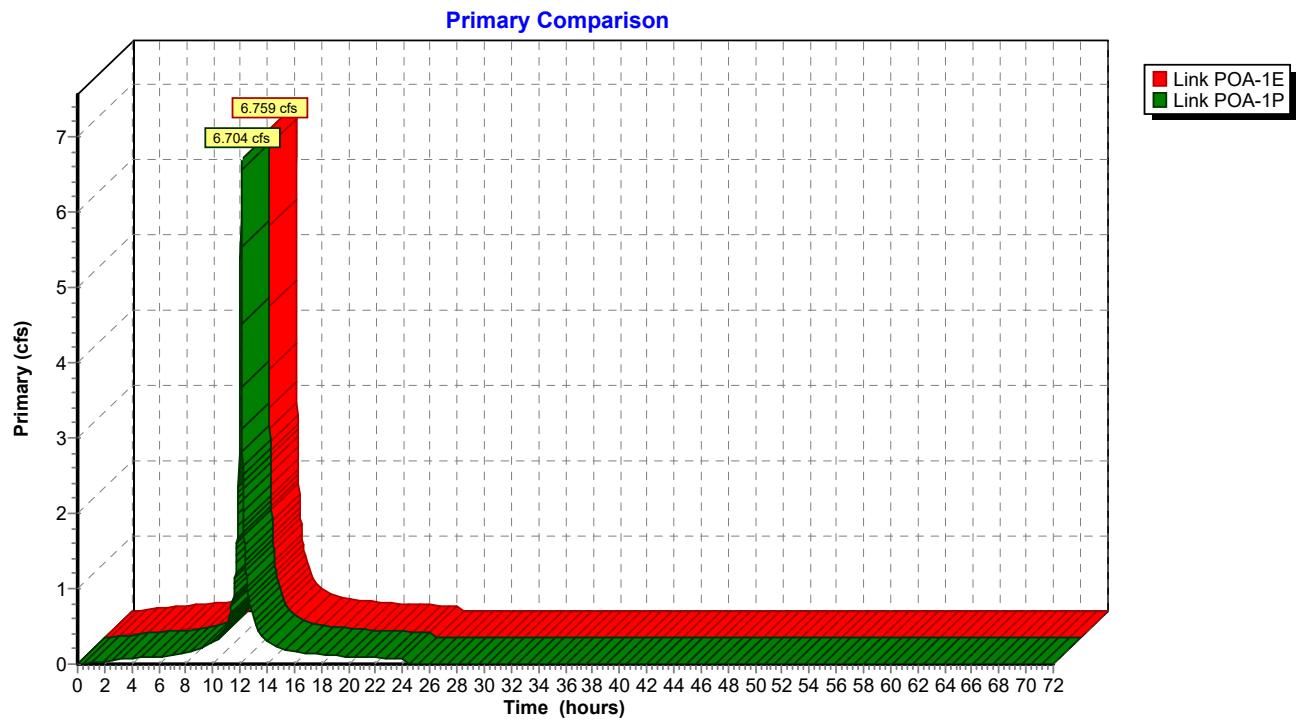
**230407- Freddys**

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*NOAA 24-hr D B-10-YR Rainfall=5.12"*

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NOAA 24-hr D B-10-YR Rainfall=5.12"

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**Primary Comparison**

Time (hours)	Link POA-1E (cfs)	Link POA-1P (cfs)	Time (hours)	Link POA-1E (cfs)	Link POA-1P (cfs)
0.00	0.000	0.000	5.20	0.090	0.088
0.10	0.000	0.000	5.30	0.092	0.090
0.20	0.000	0.000	5.40	0.092	0.090
0.30	0.000	0.000	5.50	0.094	0.092
0.40	0.000	0.000	5.60	0.094	0.092
0.50	0.000	0.000	5.70	0.096	0.094
0.60	0.000	0.000	5.80	0.097	0.095
0.70	0.000	0.000	5.90	0.098	0.096
0.80	0.002	0.002	6.00	0.099	0.097
0.90	0.006	0.006	6.10	0.102	0.100
1.00	0.010	0.010	6.20	0.105	0.102
1.10	0.014	0.013	6.30	0.108	0.105
1.20	0.017	0.017	6.40	0.111	0.108
1.30	0.021	0.020	6.50	0.113	0.111
1.40	0.024	0.023	6.60	0.117	0.114
1.50	0.027	0.026	6.70	0.119	0.117
1.60	0.030	0.029	6.80	0.123	0.120
1.70	0.033	0.032	6.90	0.126	0.123
1.80	0.035	0.034	7.00	0.129	0.126
1.90	0.038	0.037	7.10	0.132	0.129
2.00	0.040	0.039	7.20	0.135	0.132
2.10	0.043	0.042	7.30	0.138	0.135
2.20	0.045	0.044	7.40	0.141	0.138
2.30	0.047	0.046	7.50	0.144	0.141
2.40	0.049	0.048	7.60	0.147	0.144
2.50	0.051	0.050	7.70	0.150	0.147
2.60	0.053	0.052	7.80	0.154	0.150
2.70	0.055	0.054	7.90	0.156	0.152
2.80	0.057	0.055	8.00	0.160	0.156
2.90	0.059	0.057	8.10	0.163	0.159
3.00	0.060	0.059	8.20	0.165	0.162
3.10	0.062	0.061	8.30	0.168	0.165
3.20	0.064	0.062	8.40	0.172	0.169
3.30	0.065	0.064	8.50	0.174	0.171
3.40	0.067	0.065	8.60	0.178	0.174
3.50	0.069	0.067	8.70	0.181	0.178
3.60	0.070	0.068	8.80	0.184	0.181
3.70	0.072	0.070	8.90	0.187	0.183
3.80	0.073	0.071	9.00	0.190	0.187
3.90	0.074	0.073	9.10	0.200	0.197
4.00	0.076	0.074	9.20	0.210	0.206
4.10	0.077	0.075	9.30	0.221	0.217
4.20	0.078	0.076	9.40	0.231	0.227
4.30	0.080	0.078	9.50	0.241	0.237
4.40	0.081	0.079	9.60	0.251	0.247
4.50	0.082	0.080	9.70	0.261	0.257
4.60	0.084	0.082	9.80	0.272	0.268
4.70	0.084	0.082	9.90	0.282	0.277
4.80	0.086	0.084	10.00	0.293	0.288
4.90	0.087	0.085	10.10	0.303	0.298
5.00	0.088	0.086	10.20	0.313	0.308
5.10	0.089	0.087	10.30	0.324	0.319

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NOAA 24-hr D B-10-YR Rainfall=5.12"

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**Primary Comparison (continued)**

Time (hours)	Link POA-1E (cfs)	Link POA-1P (cfs)	Time (hours)	Link POA-1E (cfs)	Link POA-1P (cfs)
10.40	0.334	0.329	15.60	0.188	0.187
10.50	0.345	0.340	15.70	0.186	0.185
10.60	0.382	0.376	15.80	0.182	0.181
10.70	0.419	0.413	15.90	0.179	0.179
10.80	0.456	0.450	16.00	0.177	0.176
10.90	0.494	0.487	16.10	0.174	0.173
11.00	0.531	0.524	16.20	0.170	0.170
11.10	0.597	0.589	16.30	0.168	0.168
11.20	0.663	0.654	16.40	0.165	0.164
11.30	0.729	0.720	16.50	0.162	0.161
11.40	0.796	0.786	16.60	0.159	0.158
11.50	0.862	0.852	16.70	0.156	0.156
11.60	1.160	1.146	16.80	0.153	0.153
11.70	1.227	1.214	16.90	0.150	0.150
11.80	1.680	1.662	17.00	0.147	0.147
11.90	2.337	2.314	17.10	0.145	0.144
12.00	4.035	3.996	17.20	0.141	0.141
12.10	<b>6.759</b>	<b>6.704</b>	17.30	0.139	0.138
12.20	2.443	2.446	17.40	0.135	0.135
12.30	1.720	1.713	17.50	0.133	0.132
12.40	1.254	1.249	17.60	0.129	0.129
12.50	1.186	1.180	17.70	0.127	0.126
12.60	0.885	0.882	17.80	0.124	0.124
12.70	0.815	0.812	17.90	0.121	0.121
12.80	0.748	0.745	18.00	0.118	0.118
12.90	0.682	0.679	18.10	0.115	0.115
13.00	0.616	0.613	18.20	0.114	0.114
13.10	0.548	0.546	18.30	0.114	0.113
13.20	0.511	0.508	18.40	0.113	0.113
13.30	0.473	0.471	18.50	0.112	0.111
13.40	0.435	0.433	18.60	0.112	0.111
13.50	0.397	0.395	18.70	0.110	0.110
13.60	0.359	0.357	18.80	0.110	0.110
13.70	0.348	0.346	18.90	0.109	0.109
13.80	0.338	0.337	19.00	0.108	0.108
13.90	0.327	0.326	19.10	0.108	0.107
14.00	0.317	0.316	19.20	0.107	0.107
14.10	0.307	0.305	19.30	0.106	0.106
14.20	0.296	0.295	19.40	0.105	0.105
14.30	0.286	0.285	19.50	0.105	0.105
14.40	0.275	0.274	19.60	0.104	0.104
14.50	0.265	0.264	19.70	0.104	0.103
14.60	0.255	0.254	19.80	0.103	0.102
14.70	0.244	0.243	19.90	0.102	0.102
14.80	0.234	0.234	20.00	0.101	0.101
14.90	0.223	0.222	20.10	0.101	0.100
15.00	0.213	0.213	20.20	0.100	0.100
15.10	0.203	0.202	20.30	0.099	0.098
15.20	0.200	0.199	20.40	0.099	0.098
15.30	0.197	0.196	20.50	0.097	0.097
15.40	0.194	0.194	20.60	0.097	0.097
15.50	0.191	0.190	20.70	0.096	0.096

**230407- Freddys**

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NOAA 24-hr D B-10-YR Rainfall=5.12"

Printed 4/24/2023

**Primary Comparison (continued)**

Time (hours)	Link POA-1E (cfs)	Link POA-1P (cfs)	Time (hours)	Link POA-1E (cfs)	Link POA-1P (cfs)
20.80	0.095	0.095	26.00	0.000	0.000
20.90	0.095	0.094	26.10	0.000	0.000
21.00	0.094	0.094	26.20	0.000	0.000
21.10	0.093	0.092	26.30	0.000	0.000
21.20	0.093	0.092	26.40	0.000	0.000
21.30	0.091	0.091	26.50	0.000	0.000
21.40	0.091	0.091	26.60	0.000	0.000
21.50	0.090	0.090	26.70	0.000	0.000
21.60	0.089	0.089	26.80	0.000	0.000
21.70	0.089	0.088	26.90	0.000	0.000
21.80	0.088	0.088	27.00	0.000	0.000
21.90	0.087	0.087	27.10	0.000	0.000
22.00	0.087	0.087	27.20	0.000	0.000
22.10	0.085	0.085	27.30	0.000	0.000
22.20	0.085	0.085	27.40	0.000	0.000
22.30	0.084	0.084	27.50	0.000	0.000
22.40	0.083	0.083	27.60	0.000	0.000
22.50	0.083	0.083	27.70	0.000	0.000
22.60	0.082	0.082	27.80	0.000	0.000
22.70	0.082	0.081	27.90	0.000	0.000
22.80	0.081	0.081	28.00	0.000	0.000
22.90	0.080	0.080	28.10	0.000	0.000
23.00	0.079	0.079	28.20	0.000	0.000
23.10	0.079	0.079	28.30	0.000	0.000
23.20	0.078	0.077	28.40	0.000	0.000
23.30	0.077	0.077	28.50	0.000	0.000
23.40	0.076	0.076	28.60	0.000	0.000
23.50	0.076	0.075	28.70	0.000	0.000
23.60	0.075	0.075	28.80	0.000	0.000
23.70	0.074	0.074	28.90	0.000	0.000
23.80	0.073	0.073	29.00	0.000	0.000
23.90	0.073	0.073	29.10	0.000	0.000
24.00	0.072	0.072	29.20	0.000	0.000
24.10	0.001	0.001	29.30	0.000	0.000
24.20	0.000	0.000	29.40	0.000	0.000
24.30	0.000	0.000	29.50	0.000	0.000
24.40	0.000	0.000	29.60	0.000	0.000
24.50	0.000	0.000	29.70	0.000	0.000
24.60	0.000	0.000	29.80	0.000	0.000
24.70	0.000	0.000	29.90	0.000	0.000
24.80	0.000	0.000	30.00	0.000	0.000
24.90	0.000	0.000	30.10	0.000	0.000
25.00	0.000	0.000	30.20	0.000	0.000
25.10	0.000	0.000	30.30	0.000	0.000
25.20	0.000	0.000	30.40	0.000	0.000
25.30	0.000	0.000	30.50	0.000	0.000
25.40	0.000	0.000	30.60	0.000	0.000
25.50	0.000	0.000	30.70	0.000	0.000
25.60	0.000	0.000	30.80	0.000	0.000
25.70	0.000	0.000	30.90	0.000	0.000
25.80	0.000	0.000	31.00	0.000	0.000
25.90	0.000	0.000	31.10	0.000	0.000

**230407- Freddys**

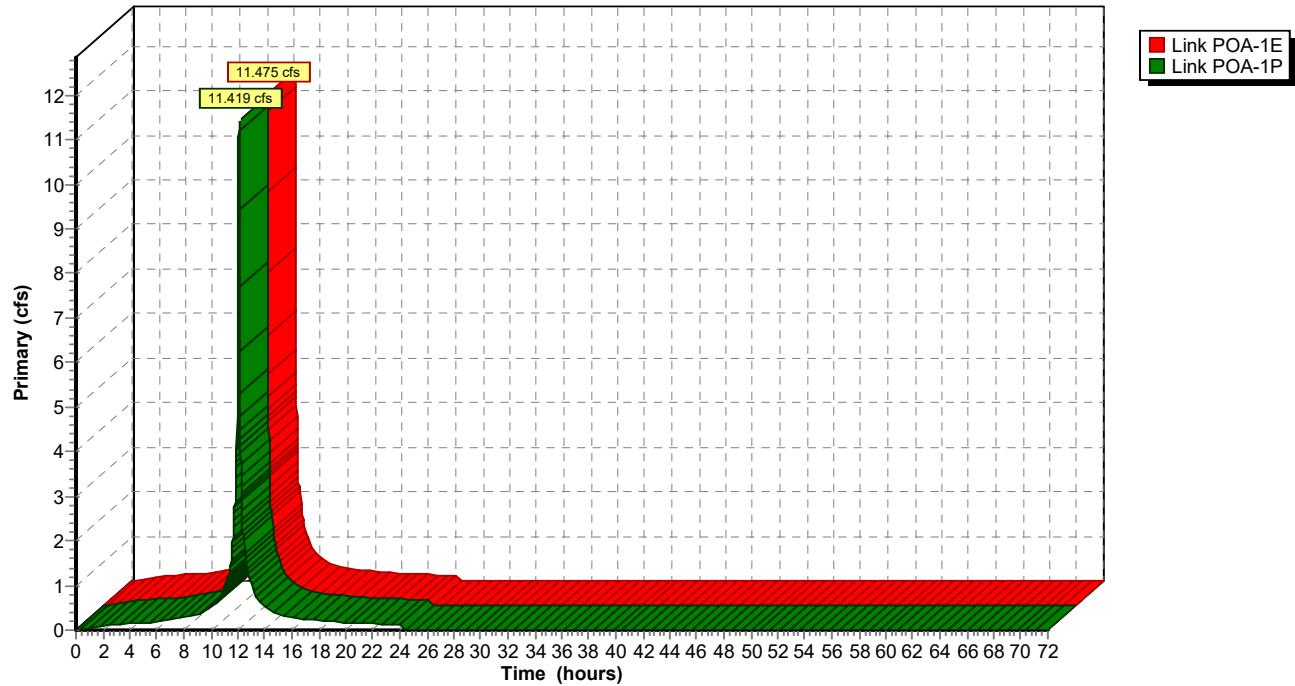
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NOAA 24-hr D C-100-YR Rainfall=8.63"

Printed 4/24/2023

**Primary Comparison**



**230407- Freddys**

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NOAA 24-hr D C-100-YR Rainfall=8.63"

Printed 4/24/2023

**Primary Comparison**

Time (hours)	Link POA-1E (cfs)	Link POA-1P (cfs)	Time (hours)	Link POA-1E (cfs)	Link POA-1P (cfs)
0.00	0.000	0.000	5.20	0.167	0.164
0.10	0.000	0.000	5.30	0.170	0.166
0.20	0.000	0.000	5.40	0.170	0.167
0.30	0.000	0.000	5.50	0.173	0.169
0.40	0.000	0.000	5.60	0.173	0.170
0.50	0.004	0.004	5.70	0.176	0.172
0.60	0.015	0.014	5.80	0.177	0.173
0.70	0.024	0.023	5.90	0.179	0.175
0.80	0.033	0.032	6.00	0.180	0.176
0.90	0.041	0.040	6.10	0.185	0.182
1.00	0.048	0.047	6.20	0.190	0.186
1.10	0.054	0.053	6.30	0.196	0.192
1.20	0.061	0.059	6.40	0.200	0.196
1.30	0.067	0.065	6.50	0.205	0.201
1.40	0.072	0.070	6.60	0.210	0.206
1.50	0.077	0.075	6.70	0.215	0.211
1.60	0.081	0.079	6.80	0.220	0.216
1.70	0.085	0.083	6.90	0.225	0.221
1.80	0.089	0.087	7.00	0.231	0.226
1.90	0.094	0.091	7.10	0.235	0.231
2.00	0.097	0.094	7.20	0.241	0.237
2.10	0.101	0.098	7.30	0.245	0.241
2.20	0.104	0.101	7.40	0.251	0.247
2.30	0.107	0.104	7.50	0.256	0.251
2.40	0.110	0.107	7.60	0.260	0.256
2.50	0.113	0.110	7.70	0.266	0.262
2.60	0.115	0.112	7.80	0.272	0.267
2.70	0.119	0.116	7.90	0.275	0.271
2.80	0.120	0.117	8.00	0.282	0.277
2.90	0.124	0.121	8.10	0.286	0.282
3.00	0.125	0.122	8.20	0.291	0.287
3.10	0.128	0.125	8.30	0.296	0.291
3.20	0.130	0.127	8.40	0.302	0.298
3.30	0.132	0.129	8.50	0.306	0.302
3.40	0.134	0.131	8.60	0.312	0.307
3.50	0.137	0.134	8.70	0.317	0.313
3.60	0.138	0.135	8.80	0.322	0.317
3.70	0.141	0.138	8.90	0.326	0.322
3.80	0.142	0.139	9.00	0.332	0.328
3.90	0.145	0.141	9.10	0.349	0.345
4.00	0.147	0.143	9.20	0.366	0.361
4.10	0.148	0.145	9.30	0.385	0.380
4.20	0.150	0.146	9.40	0.401	0.396
4.30	0.152	0.148	9.50	0.419	0.414
4.40	0.154	0.151	9.60	0.437	0.431
4.50	0.155	0.151	9.70	0.453	0.448
4.60	0.158	0.154	9.80	0.472	0.467
4.70	0.158	0.155	9.90	0.489	0.483
4.80	0.161	0.157	10.00	0.506	0.501
4.90	0.163	0.159	10.10	0.524	0.519
5.00	0.164	0.160	10.20	0.541	0.535
5.10	0.166	0.162	10.30	0.560	0.554

**230407- Freddys**

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NOAA 24-hr D C-100-YR Rainfall=8.63"

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**Primary Comparison (continued)**

Time (hours)	Link POA-1E (cfs)	Link POA-1P (cfs)	Time (hours)	Link POA-1E (cfs)	Link POA-1P (cfs)
10.40	0.577	0.571	15.60	0.318	0.317
10.50	0.594	0.589	15.70	0.314	0.314
10.60	0.657	0.651	15.80	0.308	0.307
10.70	0.721	0.714	15.90	0.303	0.303
10.80	0.785	0.778	16.00	0.299	0.298
10.90	0.849	0.842	16.10	0.294	0.294
11.00	0.912	0.904	16.20	0.288	0.287
11.10	1.025	1.016	16.30	0.284	0.284
11.20	1.136	1.127	16.40	0.279	0.278
11.30	1.249	1.240	16.50	0.273	0.273
11.40	1.362	1.352	16.60	0.269	0.268
11.50	1.474	1.464	16.70	0.264	0.264
11.60	1.981	1.967	16.80	0.259	0.259
11.70	2.095	2.082	16.90	0.254	0.254
11.80	2.866	2.847	17.00	0.249	0.249
11.90	3.981	3.957	17.10	0.244	0.244
12.00	6.863	6.823	17.20	0.239	0.239
12.10	<b>11.475</b>	<b>11.418</b>	17.30	0.234	0.234
12.20	4.143	4.160	17.40	0.229	0.229
12.30	2.916	2.912	17.50	0.224	0.224
12.40	2.125	2.123	17.60	0.219	0.219
12.50	2.009	2.005	17.70	0.215	0.214
12.60	1.500	1.498	17.80	0.210	0.210
12.70	1.381	1.378	17.90	0.204	0.204
12.80	1.268	1.266	18.00	0.200	0.200
12.90	1.155	1.153	18.10	0.194	0.194
13.00	1.043	1.041	18.20	0.193	0.193
13.10	0.928	0.927	18.30	0.192	0.192
13.20	0.865	0.863	18.40	0.191	0.191
13.30	0.800	0.799	18.50	0.189	0.189
13.40	0.736	0.735	18.60	0.189	0.189
13.50	0.672	0.670	18.70	0.187	0.186
13.60	0.607	0.606	18.80	0.187	0.186
13.70	0.589	0.588	18.90	0.184	0.184
13.80	0.572	0.571	19.00	0.183	0.183
13.90	0.553	0.552	19.10	0.182	0.182
14.00	0.536	0.536	19.20	0.181	0.181
14.10	0.519	0.518	19.30	0.180	0.180
14.20	0.501	0.500	19.40	0.178	0.178
14.30	0.484	0.484	19.50	0.178	0.178
14.40	0.466	0.465	19.60	0.176	0.175
14.50	0.449	0.448	19.70	0.176	0.175
14.60	0.431	0.430	19.80	0.173	0.173
14.70	0.413	0.413	19.90	0.172	0.172
14.80	0.397	0.396	20.00	0.171	0.171
14.90	0.378	0.377	20.10	0.170	0.170
15.00	0.361	0.361	20.20	0.169	0.169
15.10	0.343	0.343	20.30	0.167	0.166
15.20	0.338	0.337	20.40	0.167	0.166
15.30	0.333	0.333	20.50	0.164	0.164
15.40	0.329	0.328	20.60	0.164	0.164
15.50	0.323	0.323	20.70	0.162	0.162

**230407- Freddys**

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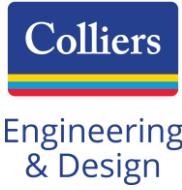
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NOAA 24-hr D C-100-YR Rainfall=8.63"

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**Primary Comparison (continued)**

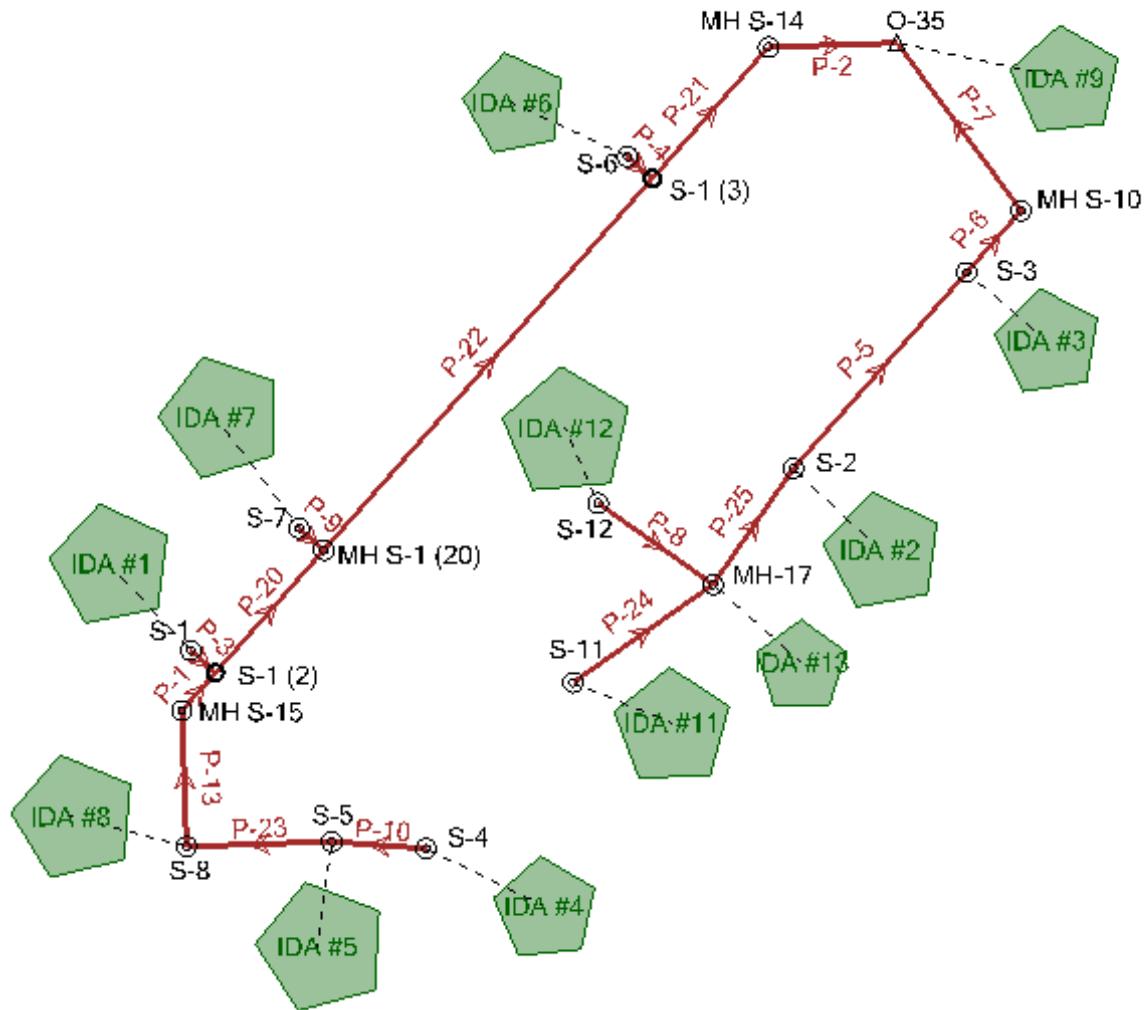
Time (hours)	Link POA-1E (cfs)	Link POA-1P (cfs)	Time (hours)	Link POA-1E (cfs)	Link POA-1P (cfs)
20.80	0.161	0.161	26.00	0.000	0.000
20.90	0.160	0.160	26.10	0.000	0.000
21.00	0.159	0.159	26.20	0.000	0.000
21.10	0.157	0.157	26.30	0.000	0.000
21.20	0.157	0.156	26.40	0.000	0.000
21.30	0.155	0.154	26.50	0.000	0.000
21.40	0.154	0.154	26.60	0.000	0.000
21.50	0.152	0.152	26.70	0.000	0.000
21.60	0.151	0.151	26.80	0.000	0.000
21.70	0.150	0.150	26.90	0.000	0.000
21.80	0.149	0.149	27.00	0.000	0.000
21.90	0.148	0.148	27.10	0.000	0.000
22.00	0.147	0.147	27.20	0.000	0.000
22.10	0.144	0.144	27.30	0.000	0.000
22.20	0.144	0.144	27.40	0.000	0.000
22.30	0.142	0.142	27.50	0.000	0.000
22.40	0.141	0.141	27.60	0.000	0.000
22.50	0.140	0.140	27.70	0.000	0.000
22.60	0.139	0.139	27.80	0.000	0.000
22.70	0.138	0.138	27.90	0.000	0.000
22.80	0.137	0.137	28.00	0.000	0.000
22.90	0.136	0.135	28.10	0.000	0.000
23.00	0.133	0.133	28.20	0.000	0.000
23.10	0.133	0.133	28.30	0.000	0.000
23.20	0.131	0.131	28.40	0.000	0.000
23.30	0.130	0.130	28.50	0.000	0.000
23.40	0.129	0.129	28.60	0.000	0.000
23.50	0.128	0.128	28.70	0.000	0.000
23.60	0.127	0.127	28.80	0.000	0.000
23.70	0.126	0.125	28.90	0.000	0.000
23.80	0.123	0.123	29.00	0.000	0.000
23.90	0.123	0.123	29.10	0.000	0.000
24.00	0.122	0.122	29.20	0.000	0.000
24.10	0.002	0.002	29.30	0.000	0.000
24.20	0.000	0.000	29.40	0.000	0.000
24.30	0.000	0.000	29.50	0.000	0.000
24.40	0.000	0.000	29.60	0.000	0.000
24.50	0.000	0.000	29.70	0.000	0.000
24.60	0.000	0.000	29.80	0.000	0.000
24.70	0.000	0.000	29.90	0.000	0.000
24.80	0.000	0.000	30.00	0.000	0.000
24.90	0.000	0.000	30.10	0.000	0.000
25.00	0.000	0.000	30.20	0.000	0.000
25.10	0.000	0.000	30.30	0.000	0.000
25.20	0.000	0.000	30.40	0.000	0.000
25.30	0.000	0.000	30.50	0.000	0.000
25.40	0.000	0.000	30.60	0.000	0.000
25.50	0.000	0.000	30.70	0.000	0.000
25.60	0.000	0.000	30.80	0.000	0.000
25.70	0.000	0.000	30.90	0.000	0.000
25.80	0.000	0.000	31.00	0.000	0.000
25.90	0.000	0.000	31.10	0.000	0.000



## Appendix C

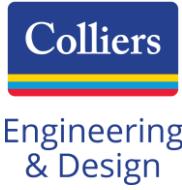
### On-Site Conveyance System Design

## Scenario: 25 yr



## FlexTable: Conduit Table

Label	Start Node	Stop Node	Length (Unified) (ft)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Manning's n	Upstream Inlet Area (acres)	Upstream Inlet Tc (hours)	Upstream Inlet C	Upstream Structure Flow (Total Surface) (cfs)	Velocity (ft/s)	Flow (cfs)	Capacity (Full Flow) (cfs)	Flow / Capacity (Design) (%)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)
P-1	S-15	S-1 (2)	15.1	113.55	113.48	0.004	15.0	0.013	(N/A)	0.000	(N/A)	0.00	3.34	1.75	4.33	40.4	114.30	114.29
P-20	S-1 (2)	S-1 (4)	49.2	113.48	113.26	0.004	15.0	0.012	(N/A)	0.000	(N/A)	0.00	3.70	2.05	4.69	43.6	114.23	114.21
P-3	S-1 (2)	S-1 (2)	10.0	13.53	13.48	0.005	15.0	0.013	0.040	0.100	0.990	0.31	0.25	0.31	4.57	6.8	114.29	114.29
P-22	S-1 (4)	S-1 (3)	148.9	113.26	112.59	0.004	15.0	0.012	(N/A)	0.000	(N/A)	0.00	4.16	3.38	4.69	72.1	114.05	113.71
P-9	S-7	S-1 (4)	10.0	13.31	13.26	0.005	15.0	0.013	0.180	0.100	0.990	1.40	1.14	1.40	4.57	30.7	114.21	114.21
P-21	S-1 (3)	S-14	52.6	112.59	112.35	0.004	15.0	0.012	(N/A)	0.000	(N/A)	0.00	4.31	4.08	4.69	87.0	113.56	113.42
P-4	S-6	S-1 (3)	10.0	12.64	12.59	0.005	15.0	0.013	0.110	0.100	0.990	0.86	0.70	0.86	4.57	18.7	113.71	113.71
P-13	S-8	S-15	40.8	113.85	113.65	0.005	15.0	0.013	0.070	0.100	0.990	0.54	3.48	1.76	4.57	38.6	114.39	114.34
P-6	S-3	S-10	24.8	12.80	12.64	0.006	15.0	0.013	0.140	0.100	0.990	1.09	4.80	4.76	5.19	91.7	13.97	13.86
P-7	S-10	O-1	62.6	12.64	12.23	0.007	15.0	0.013	(N/A)	0.000	(N/A)	0.00	4.82	4.75	5.23	90.8	13.57	13.11
P-5	S-2	S-3	78.5	13.31	12.80	0.006	15.0	0.013	0.130	0.100	0.990	1.01	4.61	3.75	5.21	71.9	14.29	14.09
P-10	S-4	S-5	28.4	114.21	114.07	0.005	15.0	0.013	0.110	0.100	0.990	0.86	2.85	0.86	4.57	18.7	114.63	114.62
P-23	S-5	S-8	43.6	114.07	113.85	0.005	15.0	0.013	0.050	0.100	0.990	0.39	3.16	1.24	4.57	27.1	114.56	114.54
P-8	S-12	S-13	43.1	13.91	13.69	0.005	15.0	0.013	0.240	0.100	0.990	1.87	3.56	1.87	4.62	40.5	14.57	14.55
P-24	S-11	S-13	37.6	13.78	13.59	0.005	15.0	0.013	0.100	0.100	0.990	0.78	2.79	0.78	4.59	16.9	14.55	14.55
P-25	S-13	S-2	56.6	13.59	13.31	0.005	15.0	0.013	0.020	0.100	0.990	0.16	3.89	2.78	4.54	61.1	14.46	14.39
P-2	S-14	O-1	38.6	112.35	112.18	0.004	15.0	0.012	(N/A)	0.000	(N/A)	0.00	4.30	4.04	4.69	86.0	113.24	112.99



## Appendix D

### Drainage Area Maps

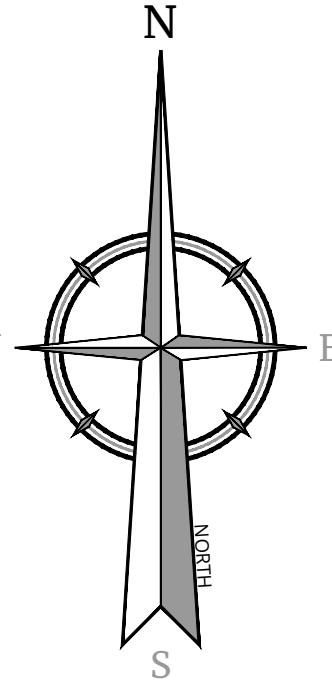


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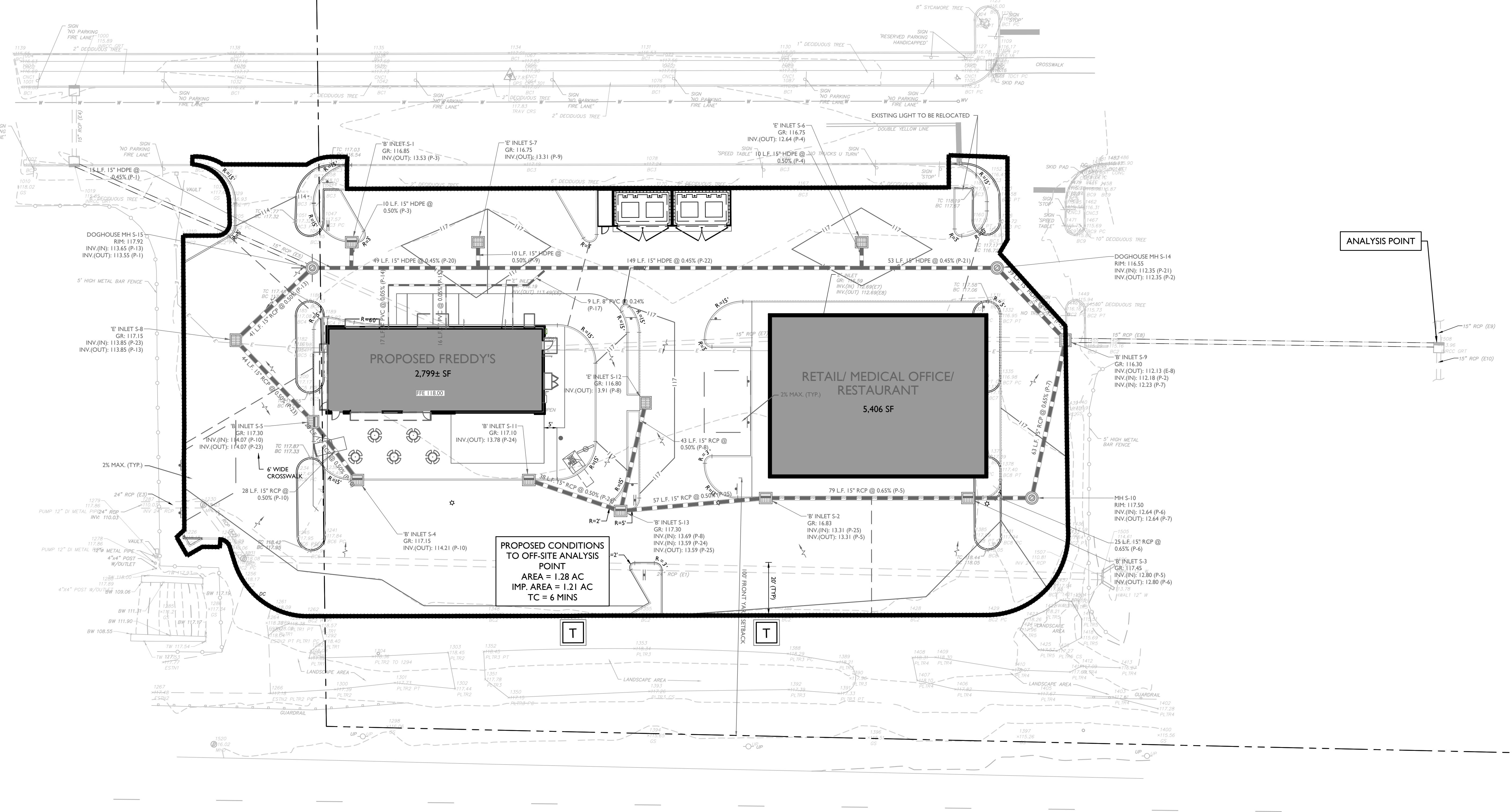
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AS SHOWN 4/6/23 MB VDK

PROJECT NUMBER: DRAWING NAME:  
21000124A C-DRNG

SHEET TITLE: PROPOSED DRAINAGE MAP

SHEET NUMBER: 2 of 3

SCALE : 1" = 20'  
Linear unit of measure: US Survey Foot (1 ft = 1200/3937 m)

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.





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